



ORR & Network Rail

**Mandate AO/015: Network Rail
bottom-up benchmarking review -
2012 update**

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This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Ove Arup & Partners Ltd
13 Fitzroy Street
London
W1T 4BQ
United Kingdom
www.arup.com

ARUP

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1 Executive summary

1.1 Introduction

This report summarises Arup's 2012 update of Network Rail's bottom-up benchmarking programme under our Independent Reporter (IR) mandate AO/015.

The focus of our assessment continued to be on the robustness of Network Rail's benchmarking approach, the level of comparative quantified benchmarking data obtained through the programme and the extent to which this informs Network Rail's CP5 expenditure and efficiency proposals to support the PR13 determination process. We review progress made since completion of our initial programme review during mid- to late-2011, including Network Rail's response to the recommendations made in that report.

Our approach entails a combination of direct engagement with project participants and stakeholders within Network Rail, independent analysis of data and systems and provision of recommendations and feedback. Arup has continued to draw upon the knowledge and expertise of benchmarking expertise from Imperial College London for this review.

We note that Network Rail's bottom-up benchmarking is an ongoing programme. The review and commentary contained within this report are limited to data provided up to 26th October 2012. Additional data emerging from the programme will be taken into account in later stages of this mandate, which will form part of Arup's progressive assurance review of evidence and analysis underpinning Network Rail's SBP submission in early 2013.

1.2 Key findings

External benchmarking data

Network Rail has continued to develop and progress its external bottom-up benchmarking activity in all main asset areas since Arup's previous review was completed in late 2011. Additional external comparator data have been obtained in most asset areas.

For each asset area, Network Rail has presented an analysis of how the findings gained from external benchmarking can be applied to delivery of maintenance and renewals activity. The level of detail, and the extent to which analysis relates specifically to CP5 expenditure and efficiency savings, varies between different asset areas.

Network Rail continues to view the bottom-up benchmarking as a long-term programme. Teams leading individual workstreams are taking a range of approaches, each of which is designed to be appropriate to the asset type and the relationships being developed with comparator organisations.

Benchmarking relationships require time and resources to establish. Both a willingness and level of mutual interest and trust between participants is necessary, in particular if parties are seeking to exchange quantified benchmarks or cost information. Experience gained by Imperial College London indicates that

the scope and nature of information obtained, particularly in early stages of benchmarking, will inevitably vary, depending on the nature of relationships established with external comparators. This variability is indeed reflected in Network Rail's bottom-up benchmarking programme, whereby detailed quantified benchmarks obtained through the track workstream contrast with limited quantified data analysis in other asset areas. (We summarise progress by workstream below). Overall, we consider Network Rail's approach forms an appropriate basis for long-term, meaningful external benchmarking.

Notwithstanding the inherent challenges described above, we consider Network Rail's continued orientation of its benchmarking activities towards best practice to be a contributing factor to the limited level of numerical analysis undertaken for many workstreams. The focus on assessing best practice has been undertaken on a largely qualitative basis, as opposed to measuring comparative cost and efficiency levels.

Overall, we consider progress made by Network Rail in obtaining external bottom-up benchmarking data to be, for the most part reasonable. We believe there is still scope in most asset areas for a greater degree of quantified data to be obtained and analysed, building on work undertaken to date. It is, however, difficult to say, based on the information provided, how quickly this may be achieved.

Internal benchmarking data

Network Rail has also progressed its internal benchmarking activities. For most asset areas, the analysis relates principally to structural factors driving cost differences between comparator projects / routes / delivery units. The main focus is on factors driving differential levels of efficiencies between different routes, with factors driving higher efficiency / lower costs for "leading edge" route highlighted as the target benchmark for others. On this basis, the reports identify qualitative factors driving efficient delivery within the given route / area, which can be applied throughout the organisation.

Overall, we consider the internal benchmarking analysis undertaken to date to be of limited significance for Network Rail's development of its CP5 expenditure and efficiency proposals. Information presented does not contain detailed quantified analysis of how efficiency opportunities link explicitly to CP5 expenditure and efficiency proposals.

We consider that for most workstreams, greater use could be made of internal benchmarking data to compare cost and identify efficiency opportunities. For maintenance activities in particular, we consider comparative benchmarking between maintenance delivery units could be used to help establish positive, quantified proposals, to spread efficient practices and reduce costs across Network Rail's organisation.

Application of benchmarking data to SBP proposals

Network Rail has stated that efficiency measures and practices identified through both the internal and the external bottom-up benchmarking will inform the Strategic Business Plan (SBP).

For CP5 track renewals, Network Rail has developed a quantified model that it plans to utilise for procurement of contractor delivered works. This draws upon external benchmarks, which inform target rates that Network Rail intends to deliver via its contractors through implementation of the relevant efficiency measures.

For signalling renewals, we understand that Network Rail has also factored the impact of efficiency initiatives identified through its benchmarking activities within its proposed contracting arrangements; however, explicit details have not been provided for review.

For the remaining asset areas a limited amount of quantified analysis has been provided within the documentation to date, which specifically links the benchmarking activities and analysis undertaken with CP5 expenditure and efficiency proposals.

Overall, given the inherent challenges involved in bottom-up benchmarking activities, we consider the application of benchmarking data to Network Rail's track renewals proposals in the SBP to be a significant achievement. However, for the remaining asset areas we do not consider it possible to state with any certainty that a substantial body of comparative data will be available for integration into the SBP proposals.

1.3 Summary of progress by workstream

We briefly summarise in this section the key elements of overall progress made by each bottom-up benchmarking workstream. See Appendix B for a more detailed review of both external and internal benchmarking activities.

Track

External quantified benchmarking data have been obtained from a number of European rail comparator organisations, and the cost differentiating factors analysed.

Network Rail has applied efficiency initiatives identified through bottom-up benchmarking programme to its CP5 track procurement model, which informs its SBP expenditure proposals. This model was shared with us at a meeting on 26th September 2012.

Although data and calculations have not been provided to us for direct review for confidentiality reasons, the material presented and explained to us in meetings appears to demonstrate explicit and quantified proposals, which clearly make use of the bottom-up benchmarking undertaken.

Signalling

Qualitative and quantitative external benchmark data have been obtained from European comparator organisations through a number of studies. (Note: quantified source data have not provided for first-hand review for confidentiality reasons). A range of efficiency initiatives have been identified, based on mainly qualitative comparisons of specific efficiency factors / initiatives between comparator organisations.

We understand Network Rail proposes to implement initiatives identified through bottom-up benchmarking programme into its CP5 signalling contracts, which will form part of its SBP expenditure proposals. However, details of proposed initiatives within contracts have not yet provided for review.

Telecoms

Quantified benchmarking data have been obtained from European rail comparator through Network Rail's participation in the formal RTC benchmarking group, with analysis undertaken of cost differentiating factors. Internal benchmarking comparisons have also identified factors driving potential cost savings.

However, data have not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided.

Electrification & Fixed Plant (E&P)

Data obtained through external benchmarking of E&P activities are principally qualitative in nature, with a limited amount of quantified comparative data obtained through benchmarking with UK energy distribution network operators (as documented in our previous review). Internal benchmarking activities have also yielded predominantly qualitative comparisons, with data quality issues restricting the level of quantitative analysis.

As for telecoms, E&P benchmarking data have not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided.

Buildings & civils

Both qualitative and quantitative benchmarking data have been obtained for buildings & civils assets, based on various comparisons with external comparators. Most notably, work undertaken through the benchmarking alliance study (led by the IP workstream) has yielded quantified benchmarks for a selection of buildings and civils renewal activity types. Internal benchmarking activities have also provided quantified data, with analysis of structural factors influencing relative efficiency levels.

However, buildings & civils benchmarking data (like telecoms and E&P), have not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided.

Maintenance

Network Rail's external bottom-up benchmarking, undertaken by means of first-hand observations of maintenance delivery, has yielded both qualitative and quantitative external benchmarking comparisons. Drawing upon the data obtained, Network Rail has presented, in mainly qualitative terms, a range of areas of efficiency improvement.

Network Rail's internal maintenance benchmarking continues to focus mainly on the analysis of cost-differentiating factors affecting differences in relative cost levels between different delivery units across the business.

Overall, in spite of the comparatively wide-ranging scope of benchmarking analysis undertaken, the data provided have not been explicitly analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided.

1.4 Recommendations

We have reviewed Network Rail’s responses and the progress made in relation to the recommendations provided in our original benchmarking review report (completed mid- to late-2011). We summarise Network Rail’s response and our review of progress in the table below. See Chapter 4 for a more detailed review

Recommendation to Network Rail	Network Rail response ¹	Arup opinion
<i>Programme-level recommendations</i>		
<p>2011.BUB.1: set the requirement to obtain quantified data to support and substantiate the efficiency gap as an explicit objective for each workstream. .</p>	<p>Conditionally accepted (as secondary requirement for workstreams).</p>	<p>Limited progress. We consider acceptance of this recommendation as only a secondary requirement may have contributed to limited levels of quantified data obtained to date.</p>
<p>2011.BUB.2: Develop a detailed comparator engagement plan for each workstream.</p>	<p>Accepted.</p>	<p>Significant progress.</p>
<p>2011.BUB.3: Develops ties with further comparator organisations beyond the present comparator pool.</p>	<p>Accepted - already in progress.</p>	<p>Moderate progress. We consider this reasonable, given the time and effort inherent in the process of establishing ties with additional comparators.</p>
<p>2011.BUB.4: explore to increase level of data sharing with existing comparators, apply techniques for obtaining more quantified observations.</p>	<p>Accepted.</p>	<p>Moderate progress. We consider this reasonable, given the time needed to establish relationships with comparators in order to facilitate mutually beneficial data sharing, and the time and resources needed to gather quantified observations.</p>

¹ Source: “Network Rail position on Arup’s recommendations 3 May 2012 (2).ppt”, provided 4th May 2012

Recommendation to Network Rail	Network Rail response ¹	Arup opinion
<p>2011.BUB.5: develop a coordinated set of explicit benchmarking data specifications / criteria for each workstream.</p>	<p>Accepted in the context of response to 2011.BUB.1.</p>	<p>Moderate progress. We consider a greater emphasis by Network Rail on quantifying its relative efficiency position (as per 2011.BUB.1 above) is likely to have enabled it to develop a greater understanding of quantified data availability, enabling it to specify more concrete targets for capturing quantified data.</p>
<p>2011.BUB.6: detailed explanatory document setting with key assumptions and rationale for each workstream.</p>	<p>Accepted</p>	<p>Moderate Progress. We consider this reasonable, given most workstreams have yet to obtain substantial quantified data. The assumptions and methodology for analysing and applying benchmarking data can be further developed as the respective workstreams progress in obtaining more quantified observations (see previous recommendations).</p>
<p><i>Workstream-specific recommendations</i></p>		
<p>2011.BUB.7: Track - further analysis to support CP5 efficiency proposals for S&C renewals including analysis of implementation cost relating and detailed assessment of risks.</p>	<p>Accepted, already in progress.</p>	<p>To be reviewed as part of Independent Reporter mandate AO/035 (CP5 efficiencies).</p>
<p>2011.BUB.8: Track - comparative approach based on costing work banks seen overseas as if they were undertaken in the UK.</p>	<p>Conditionally accepted.</p>	<p>Significant Progress.</p>

Recommendation to Network Rail	Network Rail response ¹	Arup opinion
<p>2011.BUB.9: Buildings & civils - further analysis to support its CP5 efficiency proposals including analysis of implementation cost and detailed assessment of risks.</p>	<p>Accepted, already in progress.</p>	<p>To be reviewed as part of Independent Reporter mandate AO/035 (CP5 efficiencies).</p>
<p>2011.BUB.10: Maintenance - Utilisation of time series data from other railways to identify where these organisations have driven down maintenance costs.</p>	<p>Accepted.</p>	<p>Limited progress. We consider the identification and development of efficiency proposals could have been supported through utilisation of time series data. We understand such data has not been utilised within the maintenance benchmarking and analysis to date.</p>
<p>2011.BUB.11: Maintenance - Bayesian approach to support Network Rail's internal numerical benchmarking analysis</p>	<p>Accepted.</p>	<p>Limited progress. Although not implemented within the maintenance benchmarking activity undertaken to date, Network Rail has indicated it has concrete proposals to adopt this approach in future maintenance benchmarking work.</p>
<p>2011.BUB.12: Maintenance - consideration of alternative statistical techniques (identified by Arup / Imperial) for internal maintenance analysis.</p>	<p>Accepted, already in progress.</p>	<p>Limited progress. We consider the identification and development of efficiency proposals could have been supported through utilisation of alternative statistical techniques. We understand that no such techniques have been utilised within Network Rail's maintenance benchmarking and analysis to date.</p>

Recommendation to Network Rail	Network Rail response ¹	Arup opinion
<i>Alternative benchmarking approaches for consideration by ORR</i>		
<p>2011.BUB.13: Consideration of alternative comparative analytical approaches (suggested by Arup / Imperial) for identifying efficiency potential.</p>	<p>Conditionally accepted.</p>	<p>Moderate progress. We consider this to be reasonable. ORR and Network Rail are progressing a number of alternative comparative analytical approaches.</p>

1.5 Next steps for IR review

The focus of this report has been on progress made by Network Rail in its bottom-up benchmarking programme since our previous review (in mid- to late-2011), including with respect to our original recommendations.

We recognise that Network Rail’s bottom-up benchmarking is an ongoing process. We expect to continue to update our review to take into account any additional data and analysis emerging from the programme. This ongoing work will form part of Arup’s wider progressive assurance role, supporting the ORR’s assessment of evidence and analysis underpinning Network Rail’s SBP submission.

The precise form and format of ongoing work under this mandate are expected to be finalised in forthcoming tripartite meetings.²

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² Ongoing work under our bottom-up benchmarking review will be undertaken in close coordination with related Arup mandates AO/034 (PR13 review of maintenance and renewal unit costs) and AO/035 (PR13 review of Network Rail’s CP5 efficiency projections and supporting evidence).

2 Introduction

2.1 Background and objectives

This report summarises the findings of Arup's 2012 update of Network Rail's bottom-up benchmarking programme. This work has been undertaken under Independent Reporter mandate AO/015: Network Rail Bottom-up Benchmarking Programme Review (attached as Appendix A of this document), in accordance with the terms of our proposal letter (issued on the 18th July 2012).

The focus of our assessment continues to be on the robustness of the benchmarking approach, the level of comparative quantified benchmarking data obtained through the programme and the extent to which this informs Network Rail's CP5 expenditure and efficiency proposals within its forthcoming Strategic Business Plan (SBP). We review progress made since completion of our initial programme review undertaken mid- to late-2011 (captured in our initial report dated 23rd January 2012), including Network Rail's response to the recommendations made in that report.

2.2 Our approach

Arup's approach entails a combination of direct engagement with project participants and stakeholders within Network Rail, independent analysis of data and systems and provision of recommendations and feedback.

Our central liaison has been with the team at Network Rail HQ leading the development of Network Rail's CP5 expenditure and efficiency proposals that form part of its SBP. Meetings have been held with the Network Rail teams leading each of the benchmarking workstreams for the respective asset areas, to discuss progress and facilitate the sharing of latest benchmarking documentation and analysis. We attach as Appendix C a list of the meetings held.

We have also been provided with a range of documentation and data relating to the various workstreams. We note that Network Rail's bottom-up benchmarking is an ongoing programme, and the review and commentary contained within this report is limited to data provided up to 26th October 2012. Additional data emerging from the programme will be taken into account in later stages of this mandate, which will form part of Arup's continual progressive assurance review of evidence and analysis underpinning Network Rail's SBP submission in early 2013.

Report structure

The remainder of this report is structured as follows:

- Chapter 3 contains our programme-level findings.
- Chapter 4 contains an overview of our previous recommendations, Network Rail's response, and our assessment of progress against recommendations since our previous report was completed.
- Appendix A reproduces the original assignment mandate from May 2011.
- Appendix B contains our commentary and findings for each benchmarking workstream.

- Appendix C contains a register of meetings held to date under this mandate.
- A full listing all of the documentation received is included in Appendix D.

2.4 Acknowledgements

We are grateful to Network Rail staff for making themselves available to assist us with our work and their continuing co-operation in providing us with material, arranging meetings and other assistance.

3 Programme review update

3.1 Introduction

We present in this chapter the programme-level findings of our review of Network Rail's bottom-up benchmarking activities. We set out our findings and opinion under the following sub-sections:

- External benchmarking approach and strategy.
- Engagement with comparator organisations.
- Nature of external benchmarking data obtained.
- External benchmarking structure and alignment with SBP process.
- Internal benchmarking.
- Conclusions.

3.2 External benchmarking approach and strategy

Network Rail developed and progressed its external bottom-up benchmarking activity in all main asset areas since Arup's previous review was completed in late 2011.

Network Rail continues to view the bottom-up benchmarking as a long-term programme. The teams who are leading individual workstreams are taking a range of approaches, each of which is designed to be appropriate to the asset type and to the relationship developing with comparators.

Through our meetings with Network Rail and our review of documentation and data, we have found that Network Rail continues to orient its bottom-up benchmarking programme towards its prime objective of comparing maintenance and renewals activities and processes in order to identify measures to improve efficiency and highlight best practice.

The analysis of data obtained through the external bottom-up benchmarking to date that have been presented for review is predominantly qualitative in nature. Arup previously recommended that a principal objective of the programme should also be to obtain and analyse a body of numerical comparative data to support and substantiate the analysis of the efficiency gap. Network Rail stated, in response, that it considers this to be a secondary objective of the benchmarking process, which should not undermine or detract from the prime objective set out above.

Reporter Opinion

We consider Network Rail's long-term, decentralised approach to be appropriate basis for long-term, meaningful external benchmarking. Both establishing benchmarking relationships with external comparator organisations, and facilitating the process of exchanging data, require time and resources.

We expect the scope for exchanging quantified benchmarking data is likely to increase as analysis is progress and relationships with comparator organisations are further developed (we discuss this further in the next section). However, we consider that a greater emphasis should be placed on collecting and analysing numerical benchmarking data, in line with our recommendations (in particular 2011.BUB.1 and 2011.BUB.4) to support the process of delivering an increased level quantified analysis through the programme.³

3.3 Engagement with external comparator organisations

As stated previously, Network Rail is taking a long-term approach to the bottom-up benchmarking programme. However, the degree of engagement with external comparator organisations, as well as the level of progress and depth of data sharing, vary significantly between workstreams.

Network Rail has stated that establishing the level of relationship with external bodies to facilitate data-sharing has taken time. Not all of the benchmarking workstreams began at the same time, and the response of comparator organisations has varied.

Overall, the sharing of track renewals benchmarking data across a number of European rail operators, and establishment of the RTC benchmarking group via the telecoms workstream, are examples of significant progress. A clear intent has been expressed by all benchmarking workstream teams to establish meaningful relationships with external comparator organisations although the level of comparator engagement across other workstreams varies. (See Appendix B for further details),

Reporter Opinion

We consider Network Rail's progress in engaging with external comparator organisations to be, on the whole, reasonable. Arup recognises that establishing benchmarking relationships with external comparator organisations is not a straightforward process. It requires time and resources, as well as a willingness and level of mutual interest between participants.

Experience gained by Imperial College London from its now well established benchmarking activities indicates that the scope and nature of information obtained, particularly in early stages of benchmarking, will inevitably vary, depending on the nature of relationships established with respective external comparator organisations.

We regard the commitment amongst comparator organisations including Network Rail, to developing a clearly defined and structured forum for the beneficial sharing and analysis of comparative information, as an important factor in successful data sharing in workstreams such as telecoms.

We consider that Network Rail should continue to encourage all workstreams as far as possible to engage with comparators on the basis of collaborative, robust and

³ We discuss Arup's previous recommendations, and Network Rail's response to them, in Chapter 4 of this report.

consistent data sharing that is likely to be necessary to achieve meaningful results. This should be supported by systems and authority as reflected in a number of our recommendations (see Chapter 4). Our previous report under this mandate provided guidance with regard to the development of effective benchmarking groups.⁴

3.4 Nature of external benchmarking data obtained

We summarise in this section the nature of external benchmarking data obtained and analysed for each workstream. A more detailed overview of external benchmarking data per workstream is provided in Appendix B.

Track

External quantified benchmarking data have been obtained from a number of European rail comparator organisations, and the cost differentiating factors analysed in terms of their efficiency potential in relation to CP5 unit costs.

Signalling

Qualitative and quantitative external benchmark data have been obtained from European comparator organisations through a number of studies. (Note: quantified source data have not provided for first-hand review for confidentiality reasons). A range of efficiency initiatives have been identified, based on mainly qualitative comparisons of specific efficiency factors / initiatives between comparator organisations.

Telecoms

Quantified benchmarking data have been obtained from European rail comparator through Network Rail's participation in the formal RTC benchmarking group, with analysis undertaken of cost differentiating factors.

Electrification & Fixed Plant (E&P)

Data obtained through external benchmarking of E&P activities are principally qualitative in nature, with a limited amount of quantified comparative data obtained through benchmarking with UK energy distribution network operators (as documented in our previous review).

Buildings & civils

Both qualitative and quantitative benchmarking data have been obtained for buildings & civils assets, based on various comparisons with external comparators. Most notably, work undertaken through the benchmarking alliance study (led by the IP workstream) has yielded quantified benchmarks for a selection of buildings and civils renewal activity types.

Maintenance

⁴ Chapter 4 of our previous report provided guidance and recommendations regarding the establishment of benchmarking groups, recognising the importance of collaborative, robust and consistent data sharing supported by necessary systems and authority. (Mandate AO/015 Network Rail Bottom-Up Benchmarking Programme Review, Final Report, v.1.0 (January 2012))

Network Rail's external bottom-up benchmarking, undertaken by means of first-hand observations of maintenance delivery, has yielded both qualitative and quantitative external benchmarking comparisons. Drawing upon the data obtained, Network Rail has presented, in mainly qualitative terms, a range of areas of efficiency improvement.

Reporter Opinion

Alongside qualitative comparisons and information obtained through external benchmarking, the majority of workstreams have been able to obtain additional quantified comparator data. However, whilst the track workstream has applied the benchmark data to the analysis its own expenditure, quantified linkage of bottom-up benchmarking to expenditure and efficiency in other asset areas remains limited.

As stated previously in this report, we consider that a greater emphasis should be placed on collecting and analysing numerical benchmarking data, in line with our recommendations (in particular 2011.BUB.1 and 2011.BUB.4) to support the process of delivering an increased level quantified analysis through the programme.⁵

3.5 External benchmarking structure and alignment with SBP process

With regard to the structuring of the programme relative to PR13 timescales and the forthcoming SBP submission, Network Rail has presented an analysis of how the findings gained from external benchmarking for each workstream can be applied to delivery of asset maintenance and renewals activity supporting its SBP proposals. The level of detail, and the extent to which this relates specifically to CP5 expenditure and efficiency savings, varies between the different areas.

Network Rail's programme-level documentation included an external maintenance and renewals benchmarking remit setting out the following four requirements:

- Requirement 1: Identify a group of suitable international railway comparators (February 2012).
- Requirement 2: Prepare a detailed plan for engaging with our comparators (March 2012).
- Requirement 3: Benchmark activities or areas which are representative of our current spend levels or anticipated future work bank (February 2012).
- Requirement 4: Provide data (varying levels of quantified data specific for different workstreams) (July 2012).⁶

⁵ We discuss Arup's previous recommendations, and Network Rail's response to them, in Chapter 4 of this report.

⁶ Source: "Periodic Review 2013 Progressive Assurance Process M&R External Benchmarking Remit": provided 4th May 2012

The documentation also contained a spreadsheet template with specific data parameters for which quantified benchmark values are to be provided.

However, our meetings with Network Rail and review of documentation provided to date indicate that the planning of activities and delivery of objectives varies significantly across the different workstreams, and has not been carried out in accordance with the schedule of specific requirements set out in the programme level documentation set out above.

For all external benchmarking workstreams, Network Rail has set out in qualitative terms how the findings gained from external benchmarking can be applied to delivery of asset maintenance and renewals for all workstreams. For the track workstream, Network Rail has also applied efficiency initiatives identified through bottom-up benchmarking programme to its quantified CP5 track procurement model, which informs its SBP expenditure proposals. However, for the remaining workstreams, detailed quantified analysis that specifically links benchmarking activities and analysis undertaken with CP5 expenditure and efficiency proposals has not been provided.

We note that Network Rail has stated that application of benchmarking findings on a quantified basis supporting analysis is an ongoing process within SBP development and further documentation can be provided as this process progresses.

Reporter opinion

Overall, given the inherent challenges involved in bottom-up benchmarking activities, we consider the application of benchmarking data to Network Rail's track renewals proposals in the SBP to be a significant achievement. However, for the remaining asset areas we do not consider it possible, based on the documentation provided to date, to state with any certainty that a substantial body of comparative data will be available for integration into the SBP proposals.

3.6 Internal benchmarking

Internal benchmarking activities, (as is the case with external activities), are structured according to individual workstreams relating to each main asset area. A decentralised approach has been retained, with teams leading the individual workstreams taking a range of different approaches.

Internal benchmarking studies and analysis have been presented for each asset-based benchmarking workstream. The scope of comparative benchmark data and the degree of detailed analysis of the figures varies between workstreams. In general, reports presented show that comparative cost data can be provided between different routes within Network Rail, with the CAF⁷ system a principal source of data.

⁷ CAF – Cost Analysis Framework: a reporting system utilised by Network Rail to report costs for renewals projects on a unitised basis.

Network Rail has indicated that it aims to utilise internal benchmarking to inform the development of its CP5 efficiency proposals. The main results and analysis contained within the internal benchmarking documentation provided to date are associated with identification of structural factors leading to differential cost levels across different Network Rail routes or regions. A number of internal benchmarking reports highlight the “leading edge” route as the target benchmark for other routes, with some discussion within the reports of qualitative factors driving efficient delivery within the organisation. However, we have not identified any substantial analysis that explicitly links internal benchmarking activities with CP5 expenditure and efficiency proposals going forward.

Reporter opinion

Overall, we consider the internal benchmarking analysis undertaken to date to be of limited significance for Network Rail’s development of its CP5 expenditure and efficiency proposals.

We consider that for most workstreams, greater use could be made of internal benchmarking data to compare cost and identify efficiency opportunities. For maintenance activities in particular, we consider comparative benchmarking between delivery units could be used to help establish positive, quantified proposals, to spread efficient practices and reduce the costs of maintenance delivery across Network Rail’s organisation.

3.7 Conclusions

In terms of general programme-level findings, we have found the following:

- Network Rail has continued to develop and progress its bottom-up benchmarking activity in all main asset areas since Arup’s previous review was completed in late 2011. Additional external comparator data have been obtained in most asset areas.
- Network Rail has also progressed its internal benchmarking activities. For most asset areas, analysis undertaken to date relates principally to analysis of structural factors driving cost differences between comparator projects / routes / delivery units.
- Network Rail continues to orient its bottom-up benchmarking programme towards identifying measures to improve efficiency and highlight best practice.
- A decentralised approach has been retained. Teams leading the individual workstreams take a range of different approaches, each of which is designed to be appropriate to the asset type and to the relationship developing with comparators.
- A clear intent has been expressed by all benchmarking workstream teams to establish meaningful benchmarking relationships with external comparator organisations. The degree of engagement and data sharing has varied significantly across the different workstreams; this is inevitable, given the inherent challenges involved in external benchmarking activities. We believe there is still scope in most asset areas for a greater degree of

quantified external comparator data to be obtained, building on relationships that have been established and work undertaken to date.

- For track renewals, Network Rail has developed a quantified model, drawing upon bottom-up benchmarking analysis that is informing its CP5 projections in the SBP.
- For signalling renewals, we understand that Network Rail has also factored the impact of efficiency initiatives identified through its benchmarking activities into its SBP projections although however, explicit details have not been provided for review.
- For the remaining workstreams, the bottom-up benchmarking analysis has been predominantly qualitative in nature, and information has not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided.
- Overall, given the inherent challenges involved in bottom-up benchmarking activities, we consider the application of benchmarking data to Network Rail's track renewals proposals in the SBP to be a significant achievement. However, for the remaining asset areas we do not consider it possible to state with any certainty that a substantial body of comparative data will be available for integration into the SBP proposals.

To gain a more detailed understanding of progress and benchmarking data, it is necessary to review the work done for each asset workstream. We summarise our findings for each asset area in Appendix B of this document.

4 Recommendations review

This chapter compares the recommendations suggested by Arup in the Bottom-Up Benchmarking Programme Audit Report dated January 2012, with Network Rail’s formal responses dated 3rd May 2012. It also includes our opinion on actual progress made based on this progress review.

Ref.	Recommendation to Network Rail	Network Rail response ⁸	Arup opinion
<i>Alignment of objectives</i>			
2011.BUB.1	<p>We recommend that a requirement to obtain data to support and substantiate the analysis of Network Rail’s efficiency gap is defined as an explicit objective for each workstream.</p> <p>This should influence the approach taken, the scope of analysis and the utilisation of the data obtained by the given workstream. It should also help to improve visibility of efficiency factors identified by Network Rail (including initiatives already identified) and may provide additional insight in relation to how and why a given efficiency factor / opportunity is being prioritised, thereby helping justify its implementation.</p>	<p>We note Arup’s recommendation but the primary focus for the bottom up benchmarking teams has to remain to identify best practice, and from that develop efficiency plans.</p> <p>It is proposed for this recommendation to be considered as a secondary requirement to the identification of efficiency opportunities and on the condition that the pursuit of this requirement does not impact negatively the development of our relationship with our comparators</p>	<p>Limited progress: we consider that orientation of benchmarking efforts towards best practice has meant that the principal focus of benchmarking activity has remained a qualitative assessment of activities and practices. Although a number of benchmarking workstreams have obtained quantified comparator data, these have not generally been applied to a quantified analysis of Network Rail’s efficiency gap.</p>
<i>Engagement with comparators</i>			
2011.BUB.2	<p>We recommend that Network Rail develops a detailed engagement plan for each workstream, setting out specific steps</p>	<p>Accepted.</p>	<p>Significant progress: the majority of workstreams have evidenced a structured process of engagement, with the objective of establishing and maintaining a collaborative</p>

⁸ Source: “Network Rail position on Arup’s recommendations 3 May 2012 (2).ppt”, provided 4th May 2012

Ref.	Recommendation to Network Rail	Network Rail response ⁸	Arup opinion
2011.BUB.3	<p>through which it plans to initiate, establish and maintain contact. This should include both proposals for maintaining long-term, mutual engagement, and implementing procedures that ensure outputs are shared and mutual interests served, thereby maximising the prospects for obtaining meaningful data.</p> <p>We recommend that Network Rail develops ties with further comparator organisations and look more widely than the present comparator pool which is heavily oriented towards European rail organisations. In particular, we consider Network Rail should focus on benchmarking with light-rail / metro organisations both within the UK and internationally, for which we consider there to be a significant level of potential comparability in spite of differences in infrastructure characteristics. We also consider Network Rail should explore contacts with non-European heavy rail organisations. (Note: recommended comparators and contact details have been provided by Arup/Imperial through feedback sessions provided for each workstream.).</p>	<p>Accepted</p> <p>We are already in contact with light rail and non-European organisations</p>	<p>benchmarking relationship on a cooperative long-term basis.</p> <p>Moderate progress: the extent to which Network Rail has developed ties with further comparator organisations varies between the different workstreams. For the most part, additional contacts have been sought and initiated (this has included contacts identified by Arup / Imperial College during earlier stages of this study) with contact established with several additional comparator organisations though, for example, the buildings and maintenance workstreams.</p> <p>However, we consider that on the whole, a greater number of comparators willing to actively engage in the sharing of quantified data are needed, to support sufficiently robust quantified benchmarking that can inform analysis of the efficiency gap.</p> <p>Overall, we consider the level of progress to be reasonable, given the time and effort inherent in the process of establishing ties with additional comparators.</p>

Ref.	Recommendation to Network Rail	Network Rail response ⁸	Arup opinion
Benchmarking dataset			
2011.BUB.4	<p>We recommend that Network Rail should explore means through which the amount of data - and the level of detail - can be increased from existing comparators. This should include exploring means through which existing datasets can be deepened and more observations obtained, e.g. through greater number of activities, increased use of questionnaires / automated data sharing.</p>	<p>Accepted</p> <p>But not sure how practical it is to achieve</p>	<p>Moderate progress: Network Rail has generally progressed its engagement with comparator organisations by sharing a greater degree of qualitative, as opposed to quantitative, data. As stated previously, the emphasis remains on comparing activities and practices. Network Rail has highlighted the continued reluctance on the part of comparators to share cost-related data. We recognise this, but consider that it should still be feasible for Network Rail to collect a higher level of quantified observations or measures through its comparator engagement, that can be applied to the quantified analysis of efficiency. (See for example, guidance and recommendations for effective benchmarking groups set out in Arup’s previous report, Chapter 4).</p> <p>Overall, we consider the level of progress to be reasonable, given the time needed to establish relationships with comparators in order to facilitate mutually beneficial data sharing, and the time and resources needed to gather quantified observations.</p>
2011.BUB.5	<p>We recommend that Network Rail develops a set of coordinated benchmarking data specifications / criteria, taking programme level objectives (in relation to overall efficiency gap) and setting these out as explicit data requirements for each workstream. This should include criteria to ensure a</p>	<p>Accepted in the context of</p> <ul style="list-style-type: none"> • our position on Arup’s recommendation 2011.BUB.1, and • a very pragmatic approach based on what we can realistically achieve over the 	<p>Moderate progress: Network Rail specifies within its central remit documentation, the scope of comparator data and the parameters it is seeking to compare for each benchmarking workstream, including a spreadsheet template provided to capture initial benchmark values. A general target date for completion of initial “short term” data collection to this level is stated for June 2012.</p> <p>However, we have not yet seen any evidence that the</p>

Ref.	Recommendation to Network Rail	Network Rail response ⁸	Arup opinion
	<p>sufficiently representative dataset – e.g. for breadth of data in relation to areas of expenditure, level of depth and detail, sample size, and nature of comparative data. This should also account for incremental progress as the benchmarking progresses and increasing level of data are obtained (timetable / “roadmap”).</p>	<p>next 12 months</p>	<p>central data template for capturing benchmark data is being utilised at the workstream level, or that any benchmark values relative to the parameters within the spreadsheet have been obtained to date (August 2012).</p> <p>We consider a greater degree of focus by Network Rail on quantifying its relative efficiency position (as per 2011.BUB.1 above) is likely to have enabled Network Rail to develop a greater understanding of quantified data availability, enabling it to specify more concrete targets for capturing quantified data.</p>
<p><i>Benchmarking data analysis</i></p> <p>2011.BUB.6</p>	<p>Recommendation: We recommend that each benchmarking workstream lead provides a detailed explanatory document setting out the key assumptions and rationale relating to benchmarking data outputs. This should include:</p> <ul style="list-style-type: none"> • details of incoming data adjustments and normalisation; • an explanation of the process by which key cost / efficiency factors have been identified and prioritised, and those factors excluded / marginalised from the analysis; and • details of the application and extrapolation of the data to higher-level expenditure and efficiency proposals / projections. 	<p>Accepted</p>	<p>Moderate Progress: Network Rail documents received to date generally provide a detailed explanation of the approach taken, the assumptions made and the underlying rationale. We consider there are still areas where the basis for quantified comparisons of expenditure could be explained and assumptions set out in greater detail, particularly with regard to the way in which data obtained are to be applied and extrapolated to expenditure and efficiency proposals / projections.</p> <p>Overall, we consider the level of progress to be reasonable, given most workstreams have yet to obtain substantial quantified data. We consider the assumptions and methodology for analysing and applying benchmarking data can be further developed as the respective workstreams progress in obtaining a greater degree of quantified observations (see previous recommendations).</p>

Ref.	Recommendation to Network Rail	Network Rail response ⁸	Arup opinion
Workstream-specific recommendations			
2011.BUB.7	Track: we recommend Network Rail undertakes further analysis to support its CP5 efficiency proposals for S&C renewals. This should include analysis of implementation cost relating to the initiatives proposed, and a detailed assessment of risks associated with the proposals.	Accepted. Already in progress.	To be reviewed through Independent Reporter mandate AO/035: It is proposed that progress against this recommendation is reviewed as part of Arup’s forthcoming IR mandate AO/035, which focuses specifically upon Network Rail’s proposals for CP5 efficiency.
2011.BUB.8	Track: we recommend that Network Rail undertakes comparative analysis between itself and its peers by costing work banks seen overseas as if they were undertaken in the UK.	Accepted on the condition that the word “work banks” is replaced by “projects”	Significant Progress: Network Rail has developed a quantified set of target unit rates that it is factoring in to its CP5 expenditure proposals for the SBP, drawing upon the findings from its bottom-up benchmarking programme.
2011.BUB.9	Buildings & civils: we recommend Network Rail undertakes further analysis to support its CP5 efficiency proposals for Buildings & Civils activities. This should include analysis of implementation cost relating to the efficiency initiatives proposed, and a detailed assessment of risks associated with the proposals.	Accepted. Already in progress.	To be reviewed through Independent Reporter mandate AO/035: It is proposed that progress against this recommendation is reviewed as part of Arup’s forthcoming IR mandate AO/035, which focuses specifically upon Network Rail’s proposals for CP5 efficiency.
2011.BUB.10	Maintenance: To deepen its analysis, we recommend Network Rail to use time series data from other railways to identify where these organisations have driven	Accepted Implementation of this recommendation is conditional on sourcing robust comparable data	Limited progress: We understand that no time series data has been utilised within Network Rail’s maintenance benchmarking and analysis to date.

Ref.	Recommendation to Network Rail	Network Rail response ⁸	Arup opinion
2011.BUB.11	<p>down maintenance costs. This should allow Network Rail to explore in detail whether these cost savings arise from efficiency, deferred maintenance or the impact of renewals or enhancement spending.</p> <p>Maintenance: to support Network Rail’s internal maintenance benchmarking activity we suggest the merits of a ‘Bayesian’ approach. To ensure transparency, we recommend that inputs & assumptions are clearly laid-out to support such analysis.</p>	<p>from other railways.</p> <p>Accepted, we will consider the merit of a Bayesian approach versus alternative approaches.</p>	<p>We consider the identification and development of efficiency proposals could have been supported through utilisation of time series data.</p> <p>Limited progress: Although not implemented within the maintenance benchmarking activity undertaken to date, Network Rail has indicated it has concrete proposals to adopt this approach in future maintenance benchmarking work.</p>
2011.BUB.12	<p>Maintenance: For present and future internal benchmarking analysis of efficiency across MDUs, we recommend that Network Rail considers the following statistical techniques:</p> <ul style="list-style-type: none"> • Semi/non-parametric estimation. • Confounding / omitted variable bias (OVB). • Normalised dependent variable. • Cost function with price data. • Use of temporal as well as cross-sectional analysis. • Analysis by category of spending. • ANOVA for grouping analysis. 	<p>Accepted.</p> <p>Already in progress.</p>	<p>Limited Progress: Network Rail has indicated that it has not undertaken any further statistical analysis of MDUs since the last review, nor have these approaches been applied to the analysis of MUCs.</p> <p>We consider the identification and development of efficiency proposals could have been supported through utilisation of alternative statistical techniques.</p>

Ref.	Recommendation to Network Rail	Network Rail response ⁸	Arup opinion
<p>Alternative benchmarking approaches for analysis by ORR</p> <p>2011.BUB.13</p>	<p>We recommend that ORR considers alternative comparative analytical approaches to support its analysis of Network Rail’s efficiency level and CP5 targets for the PR13 review process. We recommend the ORR considers the following:</p> <ul style="list-style-type: none"> a. Analysis of efficiency potential using internal Network Rail cost data. b. Qualification of renewals capex according to quality of proposals. c. Bottom-up engineering models for technical comparison. 	<p>Network Rail proposed position:</p> <p>This suggestion is fine in principle, but the limitations of such analyses need to be understood by ORR, and taken into account when using the outputs.</p> <p>This suggestion is fine in principle, but we would want a list of criteria in line with ORR’s request that we demonstrate lowest whole-life cost. We would also want clarity on the “benchmark” of what is a good quality proposal as we do not have like for like comparator in the UK (unlike the water companies)</p> <p>Still unsure what Arup’s mean by bottom up engineering models</p>	<p>Moderate progress: We understand that the ORR and Network Rail are in the process of undertaking regional benchmarking analysis.</p> <p>.</p> <p>Moderate progress: We understand that the ORR and Network Rail are in the process of developing regional benchmarking. ORR considers this to be a step change compared to previous price reviews.</p> <p>Moderate progress: Arup is in the process of developing proposals for undertaking comparisons of cost on this basis.</p>

Appendix A

Independent Reporter Mandate AO/15 (May 2011)

Mandate for Independent Report

Audit Title:	Audit of Network Rail's bottom-up benchmarking workstreams for maintenance and renewal
Mandate Ref:	AO/015 – to be confirmed when price is agreed
Document version:	Draft A
Date:	May 2011
Draft prepared by:	
Remit prepared by:	
Network Rail reviewer:	

Authorisation to proceed

ORR		
Network Rail		
Independent Reporter		

Background

As part of the Periodic Review 2013 (PR13) Network Rail needs to demonstrate to its stakeholders that its plans have fully considered available efficiencies. Network Rail is currently undertaking a programme of work to benchmark its maintenance and renewal (M&R) costs. This includes top-down benchmarking (econometric analysis of total M&R spend) and workstreams to benchmark costs bottom-up. Bottom-up work includes benchmarking costs against external comparators, benchmarking of costs internally (e.g. between MDUs) and benchmarking of engineering best practice.

Network Rail should demonstrate with all possible transparency the extent of its work to derive its efficiency plans. Where engineering best practice has been identified Network Rail must transparently separate identified unit cost efficiencies from scope efficiencies which will be realised through updated asset policies.

A full audit of Network Rail's bottom-up benchmarking of M&R costs is required to provide assurance that Network Rail is progressing its work to develop robust efficiency proposals for the Initial Industry Plan (IIP) and Strategic Business Plan (SBP). This work forms part of the overall progressive assurance programme.

Scope

The Independent Reporter (Part A: Finance & Efficiency) is to undertake a review and analysis of the programme of bottom-up benchmarking conducted by Network Rail in support of its PR13 submissions. The work will comprise:

1. Programme-level review of the benchmarking scope, approach and strategy.
2. Analysis of data quality, coverage and robustness, comprising:
 - a. external bottom-up benchmarking data analysis; and
 - b. internal benchmarking data analysis, which draws upon but does not duplicate the Reporter's Q4 work covering MUC and CAF unit metrics.
3. Appraisal of data reworking, normalisation etc.
4. Appraisal of outputs, including implications for ORR's use of NR's benchmarking data for its Periodic Review activities.

5. Assessment of Network Rail's methodology to incorporate the results of each benchmarking workstream into its plans for CP5.
6. Development of recommendations for programme and/or workstream changes leading up to PR13.

The scope of work will be based around two workstreams: a programme level review and detailed review of benchmarking workstreams. The key points under each workstream are set out below.

Programme level review

The reporter will:

- Assess and document the overall approach and strategy of Network Rail's bottom-up benchmarking programme, and how this relates to Network Rail's CP5 efficiency plans.
- Assess the programme structure, timescales and linkages between respective workstreams, and how these relate to the efficiency and expenditure determination process for CP5.
- Examine the approach and defined objectives of each individual workstream, taking into account the scope, breadth and range of comparators, as well as the timescales and outputs (existing and future) of the given workstream, including in relation to PR13 timescales.
- Assess the linkage of the programme with other studies and workstreams including:
 - Unit Cost Framework.
 - Asset Management policies.
 - Other internal efficiency / best-practice initiatives.
- Review and compare the benchmarking programme approach and scope in relation to benchmarking experience from other industries.
- Specify the key facets of an idealised benchmarking approach, based on best-practice and that which is considered appropriate and realistically achievable for Network Rail's benchmarking work, if different, at IIP and SBP (i.e. "what does good look like?"); establish the level of improvement required within the NR benchmarking programme to achieve this.
- Assess Network Rail's methodology to incorporate the results of each bottom-up benchmarking workstream and top-down benchmarking into its efficiency plans for CP5.
- If appropriate, make recommendations for measures to improve the benchmarking programme, its workstreams, coverage and potential to produce useful information to inform Network Rail's efficiency plans.

Benchmarking data analysis

The reporter will:

- For each workstream, review the appropriateness of the benchmarking approach adopted, its strengths and weaknesses and its comparison to best practice.
- Carry out a review of the quality, suitability and robustness of benchmarking data (both internal and external and including the collection of data for normalisation purposes) for each key category of maintenance and renewals expenditure used in the determination process. Review the extent to which internal data are available on a regional basis suitable for benchmarking, with particular emphasis on operating routes, Scotland, England, Wales and MerseyRail.
- Review the methodology by which data are collated and normalised, taking into account the sourcing of input data and the scope of data reworking that may be required.
- Assess linkage between external input data and Network Rail's internal unit cost metrics; analyse data granularity, level of comparability, normalisation of comparator source data, and measures taken to ensure consistency of approach.

- Review data coverage levels and use of extrapolation, assess whether the outputs produced are sufficiently comprehensive and representative, and review the process by which individual outputs are linked to overall expenditure at the macro level.
- Provide a view on the quality and range of certainty of the benchmarking outputs.
- Review how unit cost benchmarking data can be meaningfully assessed alongside “real” maintenance and renewal items that NR will be using in its Asset Management Lifecycle Plans.
- Establish the fitness for purpose of the output data for determining available efficiencies in CP5 in each main asset expenditure category and by operating route, Scotland, England, Wales and MerseyRail.
- If appropriate, make recommendations for measures to improve input and output data quality, robustness and coverage, and identify and assess potential alternative sources of comparator data.
- Provide to ORR all data and documentation submitted by NR and comparator organisations in its original format wherever possible and explanations where not.

Methodology

The reporter is to conduct the audit of Network Rail’s bottom-up benchmarking workstreams to deliver the above scope through direct engagement with Network Rail including:

- Interviews at all levels within the business to assess the adoption of best practice benchmarking appropriate to the costs being assessed, and the robustness of the work being undertaken;
- Review of all data collection processes;
- Review of benchmarking input information, including Network Rail’s internal data and data sourced externally; and
- Review of all benchmarking outputs, documentary evidence and reports produced by Network Rail.

The reporter is to take account of the findings of Arup’s May 2010 report “Audit of the Robustness of the NR Unit Cost Framework” and their Annual Return Audit 2009/10 and avoid duplication of work. The reporter is to meet with the Part C reporter, Nichols, to understand the overlap with its review of enhancement project benchmarking and to avoid duplication of work.

The reporter should be aware of the need to include pre-arranged review points in the proposed programme of work. This will help to ensure that the focus for deliverables is clear and reflects emerging findings.

Deliverables

The reporter is to deliver:

- Monthly, detailed update of progress including interviews conducted, work reviewed, level of engagement, forward looking work plan, emerging findings
- Detailed written report presenting progress following submission of IIP and supporting evidence and its review. Where applicable the report is to include detailed SMART recommendations for improvements to the benchmarking programme and individual programmes to better inform Network Rail’s efficiency plans.
- Detailed written report reviewing the Network Rail’s benchmarking programme including its SBP efficiency and benchmarking submission and all supporting evidence.

Timescales

- Kick-off meeting and commencement of work May 2011
- First monthly progress update to be provided one month following kick-off meeting
- Draft A of IIP benchmarking report by mid October 2011
- Draft B of IIP benchmarking report by early November 2011
- Draft A of SBP benchmarking report by mid February 2013
- Draft B of SBP benchmarking report by early March 2013

Independent Reporter remit proposal

The reporter shall prepare a proposal for review and approval by the ORR and Network Rail on the basis of this mandate. The approved proposal will form part of the mandate and shall be attached to this document.

The proposal will detail tasks, programme, deliverables, resources and costs. The proposal should be flexible to accommodate the uncertainty over the data available at critical milestones and therefore work required.

The proposal is to include detailed CVs of the proposed team to support the reporter demonstrating relevant experience in international best practice and unit cost benchmarking.

Appendix B

Workstream-level data review

B1 Introduction

We present in this section of our report a review of the progress made by each of the eight asset-based benchmarking workstreams, in relation to the following aspects:

- Nature and scope of comparator information obtained since our previous review.
- Methodology by which information has been captured and interpreted.
- Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail's overall expenditure in the given area.
- How comparator information is normalised and compared to Network Rail activities / outputs / costs.
- Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.

B2 Track Benchmarking

We set out in this section our findings with regard to Network Rail’s external and internal benchmarking activities led by the central Asset Management (AM) team.

B2.1 External bottom-up benchmarking –Track

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>The track BUB benchmarking programme has developed further with additional visits to international and domestic railway counterparts. Since the last review, additional site visits in Sweden (3), Switzerland (1), Spain (1) and London Underground (1) have been accomplished, achieving a total of 12 site visits in 7 countries in the whole period of the work. Since the last review, these visits have been supplemented with meetings with London Underground and RFI (Italy).</p> <p>The focus of the workstream and overseas visits has been on identifying best practices and an analysis of the procedures being implemented. Unit rate comparative analysis has also been conducted.</p> <p>Network Rail provided a “Track Delivery Benchmarking Report” on 14th September 2012, summarising the findings from its external international benchmarking activities with the national rail organisations of Sweden, Switzerland, Italy, France and Spain. The analysis is based upon information gathered through site visits and meetings with respective rail organisations carried out during mid- to late-2011, apart from Spain’s operator Adif, with which visits and consultations were held during mid-2012.</p> <p>Information presented is both qualitative – with commentary on differences in a number of aspects of track renewals delivery and asset management practices – and quantitative, with a high-level comparison provided of relative unit cost levels between Network Rail and four European peers.</p> <p>In addition Network Rail presented to us on the 26 September 2012 their procurement structure model for Plain Line and S&C to be used in the procurement of Network Rail’s contractors for CP5. The preparation of this business plan model considered the</p>
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	<p>best practices identified by Network Rail during the international benchmarking visits. The efficiency measures reflected through the model included the following best practices: reducing the size of gangs, increasing the multi-skill level of staff, reductions in the amount of plant used and overheads, changes to possessions, etc.</p> <p>The model showed a potential saving in the order of 20-30% from Network Rail's supply chain in delivering works (i.e. not including materials, insurances, etc) in comparison with 2012/13 numbers. The assumptions stated show considerable differences to the current policies and <i>modus operandi</i> of the industry in Great Britain which may require an industry-wide culture change to secure efficiencies. From our review with Network Rail, we understand that stated efficiencies are mainly driven by the proposed assumptions which are in line with the efficiencies observed during the benchmarking site visits.</p> <p>Future activities between now and January 2013 will include a visit to the US, further discussions with Sweden, on-going liaison with London Underground, a site visit to France and further exploration of practices in Switzerland, all focusing on specific best practice areas.</p>
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<p>Methodology by which information has been captured and interpreted.</p>	<p>Site visits were organised to observe the European and domestic railway counterpart <i>modus operandi</i> on specific track plain line and S&C activities. The details of these visits were written up and alongside any observations of efficient working practices. Quantities of plant and personnel were recorded.</p> <p>Network Rail’s Track Delivery Benchmarking Report summarises a number of efficiency themes already covered in documentation and analysis provided in our previous review. These include issues around supply chain integration and interfaces with contractors, safety management, multi-skilled personnel and a reduced casual workforce, increased scope of midweek delivery, swifter processes for possession and isolation of route sections, and less onerous engineering and installation standards. The report’s quantified analysis entails the comparisons of S&C and Plain Line renewal unit costs. This compares Network Rail’s unit costs with those of Sweden, Italy, France and Switzerland. The report states that the data have been captured directly from the rail organisations themselves (rather than the LICB dataset). The original format and documentation through which the cost data were provided have not yet been provided for review. A resource comparison of personnel required to deliver a single turnout for Network Rail, Switzerland, Sweden and Italy is also provided in the report.</p> <p>Building on the analysis set out in the report, Network Rail explained in its presentation that waterfall diagrams have been developed to analyse the differences in costs between the UK and Sweden. This comparative analysis contains high-level quantification of the differences between UK (CP5 exit target rate) and frontier (assumed to be Sweden), with a numerical cost difference attributed to each of the following factors: tonnage and design life, lower handback speeds, length of possessions, safety management / safety related staff, standard designs, ‘associated plain line policy’, scope, more rapid taking of possessions, welfare activities and other ‘unexplained factors + better resource allocation’. Network Rail states that although this has provided an understanding and quantification of some of the components of the ‘efficiency gap’, it has not been possible for some structural factors to be quantified. The methodology by which these factors were quantified has not yet been provided for review.</p>
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<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>As described on the previous page, unit rate comparisons have been made between Network Rail and four European peers for S&C and plain line renewals in Network Rail’s Track Delivery Benchmarking Report. S&C and plain line renewals account for 60% of Network Rail track renewal expenditure. Network Rail has indicated that it considers Arup’s/ Imperial’s recommended five site visits for each of five countries not to have been practically achievable within the timescales of the programme to date. Due to the nature of these specific visits, Network Rail stated it was only possible to obtain a snapshot of the renewals/repair works being undertaken and not a full view on how the lifecycle works are organised.</p> <p>An understanding of the components of the ‘efficiency gap’ has been determined between Network Rail and the most efficient railway (Sweden), but (as indicated above) is not clear from material provided to date how these components were quantified.</p> <p>‘Resources employed’ were seen as easier as and more appropriate to benchmark by Network Rail than costs. Labour hours and costs were not captured, but the number of persons on site and plant used were recorded in the visit reports.</p>
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>Network Rail’s quantified comparison of unit rates presented in its Track Delivery Benchmarking Report presents raw input rates (“headline unit rate”), and adjusted rates that include a “baselined unit rate”, “normalised unit rate (no-PPP adjustment)” and an adjusted version to account for PPP. The report explains briefly some of the principles applied to comparator unit rates to ensure like-for-like comparisons, including adjustments to include management costs and capital ownership of equipment. These generally result in a narrowing of the gap between Network Rail (as the most expensive) and its comparators. The report indicates the adjustments result from discussions regarding the scope of what is included and excluded within original baseline rates provided, although the report also indicates the quality of such data is lower than Network Rail’s own cost data. We have not yet been provided with the detailed workings underpinning the original and adjusted comparator unit rates provided. Necessary adjustments were made to unit rates to ensure comparability (depreciation, management</p>

	<p>overheads, and design costs). Concerns were raised by Network Rail over whether ‘Purchasing Power Parity’ unfairly penalises Network Rail for the cost of equipment purchased on the international market and so foreign exchange rate versions of the comparisons are also provided.</p> <p>Costs were compared against Network Rail “GB CP5 Exit target rate”. We need to understand if this is a real observed cost or as it implies a target rate which implies that some level of expected but not yet realised efficiencies are already in the GB unit cost rate.</p> <p>We await further information to understand exactly how this analysis has been achieved using what available data and / or based on what professional judgements).</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Network Rail state that the track delivery strategy for CP5 is heavily informed by these visits and meetings.</p> <p>Many best practices and efficiency opportunities have been identified from site visits and meetings with other railways but the information we have to date does not show whether these have been fully costed or scaled up to estimate possible efficiencies at a national level. Network Rail state that many of the best practices require industry wide change and engagement. The full impact of benefits if practices are implemented will be observed in CP6 although some will be realised in CP5.</p> <p>In order to put in practice some of the best practices identified on the European Railway companies, Network Rail is undertaking trial runs at a 10km site in the East Midlands.</p> <p>Network Rail states that although it is very difficult to make a direct comparison of cost from country to country, the findings will be useable to inform the Strategic Business Plan (SBP).</p> <p>Under the “next steps” section of the Track Delivery Benchmarking Report, Network Rail states that the benchmarking activity has “enabled us to construct a potential new business model for S&C and plain line delivery using the principles we have seen of small, dedicated, multi-skilled high performing teams.” Network Rail states it is “looking to take this forward into our contracting strategy as early as possible”, making reference to CP5 and CP6.</p>

	<p>Network Rail also indicates that it has identified a number of areas for efficiency relating to high-output renewals and is currently developing a business model for this element for CP5. Alongside high-output renewals, other areas of focus cited in the report for forthcoming analysis include plain line asset policy, partial refurbishment asset policy and costs and overhead costs and operating structure.</p> <p>On 26th September, Network Rail shared with us, quantified efficiencies for CP5 through its procurement model described above. This model could not be released to us as the model is going to be used in the procurement of the contractors for CP5. Although the model showed some considerable potential savings it is still unclear how contractors will respond to some of the proposed changes required to deliver reduced costs. We anticipate this will be reviewed further as part of our progressive assurance review of CP5 efficiency proposals under mandate AO/035.</p> <p>Quantified efficiencies were also shown in the Network Rail’s Track Delivery International Benchmarking Report. However at this stage, no information regarding the underlying assumptions and calculations used in the preparation of the plain line and unit rate cost comparison exercise was provided, nor details of how it has been used to support the business model for CP5.</p>
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B2.2 Internal bottom-up benchmarking – Track

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>The objective of the internal benchmarking was to provide disaggregated unit rates for each region, identifying structural factors and their impact on rates, so that delivery rates can be assessed on a like for like basis in CP5.</p> <p>The main purpose of the document and analysis appears to be to help forecast and model future costs, rather than specifically identify efficiency opportunities for CP5. Notwithstanding this, the effect of this process in CP4 has been to exert pressure to drive down costs, supported by best practice transfer between delivery teams.</p>
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	<p>Structural factors have been assessed on a regular basis in CP4 and this has highlighted best practice where relevant, although the exact best practices are not reported in the document.</p> <p>Sections 3.2.4 and 3.4.4 state that “Due to the pre-existing usage of internal benchmarking to identify efficiency opportunities, and best practice as a regular part of business planning for track renewal, there is no scope for additional efficiency opportunities to be identified through further internal benchmarking.”</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>In CP4 every year the four delivery teams have costed up their projects in a controlled format to build a consistent data structure, providing a cost per category. Internal benchmarking was performed and the each cost type and the head of asset management and each of the heads of the delivery teams challenges cost differentials and highlights any best practices. The work has fed into the determination of the new route-based unit rates and with additional structural factors, determined CP5 costs.</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>The cost of activities has been benchmarked across the four delivery units on an annual basis during CP4, so a high degree of data availability is probable, although not published in detail in the report. Qualitative detail on best practices is not detailed in the report, as this is not the main aim of the work.</p> <p>The internal benchmarking covers approximately 80% of renewal spend.</p>
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>For CP4, adverse variances from national rates are identified and are either challenged or explained through the effect of localised structural factors. These are applied to CP5 modelled volumes and costs to determine the differences in unit costs for the devolved routes. Some additional structural factors for CP5 have been identified. The effect of structural factors for CP5 unit rates is quantified for each route.</p>
<p>Forward-looking application of benchmarking-based information and</p>	<p>The best practices from the CP4 benchmarking process are not reported as directly leading</p>

analysis for CP5 efficiencies underpinning the SBP efficiency proposals.	<p>into CP5 efficiency projections, although there is no evidence that they have not informed them. Nonetheless, the internal benchmarking report has not attempted to focus on efficiency opportunities and their associated quantification.</p> <p>There appears to have been a process whereby cost reductions have been overlaid on depots and delivery units if their higher costs could not be explained by local factors or reasonable explanation. Best practices have facilitated helping them reduce their costs.</p>
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B2.3 Reporter opinion

Network Rail's bottom-up benchmarking for track renewals represents the most advanced workstream within its bottom-up benchmarking programme. Network Rail was able to gather useful comparative information relevant to the assessment of expenditure and efficiency proposals for the SBP.

External quantified benchmarking data have been obtained from a number of European rail comparator organisations, and the cost differentiating factors analysed.

Network Rail has applied efficiency initiatives identified through bottom-up benchmarking programme to its CP5 track procurement model, which informs its SBP expenditure proposals. This model was shared with us at a meeting on 26th September 2012.

Although data and calculations have not been provided to us for direct review for confidentiality reasons, the material presented and explained to us in meetings appears to demonstrate explicit and quantified proposals, which clearly make use of the bottom-up benchmarking analysis undertaken.

B3 Signalling

We set out in this section our findings with regard to Network Rail’s external and internal benchmarking activities led by the central Asset Management (AM) team.

B3.1 External bottom-up benchmarking – Signalling

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Since Arup’s last review under this mandate (completed in late 2011), Network Rail has further progressed its engagement with external comparators. Network Rail has visited the offices of DB-Netze, SNCF/RFF and Jernbaneverket to further understand the structure of these organisations as well as the drivers and balance between maintenance, minor works, renewals and enhancements. Visits involved different stakeholders from the wider CP5 process representing various signalling disciplines (Policy Development, Maintenance, Level Crossings, ERTMS etc.).</p> <p>Network Rail also had discussions with a wider range of potential comparators including Japan Rail Central, ProRail and Hong Kong MTR. We understand that further progress is yet to be made with these organisations.</p> <p>Qualitative</p> <p>Through site visits, Network Rail has identified six key areas where comparators demonstrated significant advantages in their working methods. Network Rail analysed these in terms of whether they represent a scope efficiency or activity efficiency (reflected in lower unit cost levels) and provided an estimate on the difficulty of implementing them and the likely cost saving impact of any benefits.</p> <p>Quantitative</p> <p>Network Rail has formally joined and had access to the signalling cost benchmarking group within LICB. A desktop case study review has been undertaken directly with a number of comparators to</p>
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	<p>achieve a bottom-up cost analysis of signalling activity. A data set has been derived from work undertaken via the UIC INESS project, building on a commonly understood case study. Network Rail views the data set as robust due to the structured approach taken including a commonly agreed definition of the SEU (Signalling Equivalent Unit) amongst the contributors.</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>Qualitative comparator information was gathered mainly through meetings and discussions undertaken on site visits to offices. Network Rail and the comparators shared quantitative maintenance and renewal cost data, rates of renewal and overall asset populations. We understand that these data are to be used to inform efficiency proposal measures and to support the identification and quantification of a cost gap between comparators. We have not yet seen details of this information or how these data have been used for cost comparison exercises.</p> <p>In terms of quantitative analysis, Network Rail undertook a cost comparison exercise developed by the INESS project, involving a hypothetical station layout. Each of the four comparator IMs, together with Network Rail, had to state how many SEUs would be required to satisfactorily signal the layout to the required national standards and set out much this would cost. The study was provided to us for our review.</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>The cost comparison exercise undertaken within INESS project provided quantifiable data, which was utilised by Network Rail to analyse the cost gap between Network Rail and its comparators. This desktop case study is considered positive progress but it does fall short of Arup’s recommendation to benchmark and quantify five discrete activities for five comparators.</p> <p>Within each of the six areas of efficiency opportunity identified through the study, estimates of quantified impact of the efficiencies were defined in the report. The underlying calculations and assumptions for these estimates, and specific details clarifying if and when Network Rail plans implement any of the identified opportunities, have not been included within documentation provided.</p> <p>In addition the information provided does not explicitly set out the level of coverage, in terms of the</p>

	<p>proportion of expenditure analysed through the benchmarking undertaken, relative to Network Rail’s overall total CP5 signalling expenditure.</p>
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>The hypothetical case study undertaken as part of INESS project allowed for a fair comparison of signalling project delivery and costs. The inputs were controlled and standardised by each IM had to deliver the same workload. The quantified data comparison was facilitated by standardised and controlled inputs, with the SEU as a clearly defined unit of measure. Network Rail identified that some National Signalling Principles may have not been properly accounted for in this study, and there are a number of limitations in the case study method, namely the small scale of the project and the statistically small number of organisations sampled.</p> <p>This approach removed many of the uncertainties regarding understanding the different ways costs are reported (for example the boundaries between Maintenance, Minor Works, Renewals and Enhancements), different national methods of signalling (route or speed). It appears from the description of the project that the comparison of the cost has been normalised.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>In terms of forward actions, Network Rail confirmed that it will continue to engage in benchmarking activities with particular emphasis on following points:</p> <ul style="list-style-type: none"> • To obtain robust rate of renewal quantitative data. Currently evidence is mainly based on qualitative information obtained from bilateral benchmarking. • To continue to seek joint understanding of signalling cost elements in order to increase the robustness of the data e.g. SEU across comparators. • To engage in more site visits to delivery project comparisons. • To engage in longer term, structured group cost benchmarking. <p>Network Rail is looking to engage with more comparators and undertake more cost comparison exercises, however it is not clear that significant progress will be made up to the end of the year in time for the SBP efficiency proposal.</p>

B3.2 Internal bottom-up benchmarking – Signalling

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail informed us that some sections of the internal benchmarking report still require further input prior to completion. A final report is expected to be completed by the end of October 2012, post Unit Rate approvals.</p> <p>Network Rail stated that the proposed CP5 work bank introduces significant changes to the CP4 work bank and therefore to the internal benchmarking study. The benchmarking study is based upon knowledge of the Type A and B work types (traditional re-signalling) as through CP4 this type work is the primary work type and accounts for more than 60% of asset expenditure. However in CP5 the forecast work types expenditure is expected to change considerably. For example, Y1 of CP5 type A and B work declines from 41% to only 17% of spend profile. Partial renewals work which in CP4 accounts for approximately 10% of the work bank is expected to rise to 37% in Y1 of CP5 and ERTMS work type will rise from <1% currently to 24% of the work bank by the end of CP5.</p> <p>Network Rail stated that these facts have limited the potential use of the information contained within the benchmark study in terms of projecting forward possible savings in CP5. With the current projections, the more prevalent forecast work types in CP5 have limited CP4 comparisons to allow assessment of their impact in CP5. For example, for ETCS there is no internal benchmarking possible as there has only been one full (trial) project for this work type to date.</p> <p>The internal benchmarking study undertaken has been based on benchmarking delivery of SEU, Type A and B work types (traditional re-signalling). Other areas of benchmarking were initial considered but Network Rail has not pursued further due to lack RWI or because other measurements were not deemed to be as strong SEUs.</p>
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<p>Methodology by which information has been captured and interpreted.</p>	<p>Information for the benchmarking work was selected and gathered using a five step process:</p> <ul style="list-style-type: none"> • Project Selection • Data collection • Normalisation process (step 1) – deflate to 08/09 prices • Normalisation process (step 2) – eliminate structural factors that are fixed, including year on year efficiencies (step 3) that then normalise figures to a common efficiency basis • Analyse factors that are not fixed and are within the control of the project teams.
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>A comprehensive study was undertaken in terms of comparing delivered CP4 SEUs. The efficiencies identified from the quantitative analysis may be of limited benefit in terms of CP5 expenditure as it is projected that overall expenditure on SEU delivery will be reduced considerably on CP5.</p> <p>It may be of value to Network Rail to analyse other areas that currently account for a smaller part of the overall signalling expenditure but that are projected to increase in CP5.</p> <p>We understand that the signalling report is still to be finalised and that more data may be made available as part of this review.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Network Rail is planning to continue with its benchmarking of CP4 activities. Network Rail recognised the reduced benefit that this may have for CP5.</p> <p>The internal benchmark report has identified a benchmark for the lowest normalised project price/SEU and some potential opportunities for efficiency. It is unclear how these numbers will be included in SBP efficiency proposals. A further iteration of the report may be produced.</p>

B3.3 Reporter opinion

We consider significant progress has been made by Network Rail, with further international counterpart site visits and through the engagement with the cost benchmarking group.

Cost comparisons have been undertaken in both qualitative and quantitative terms, which have informed a number of efficiency opportunities that Network Rail has indicated it is planning to implement. Network Rail will continue to engage with more comparators and undertake more cost comparison exercises.

It is not clear from the information provided to date what extent Network Rail will be able to develop efficiency opportunities identified in explicitly quantified terms as part of its SBP submission. However, Network Rail has indicated that it proposes to implement initiatives identified through bottom-up benchmarking programme into its CP5 signalling contracts, which will form part of its SBP expenditure proposals. (Details of proposed initiatives within contracts have not yet provided for review).

B4 Telecoms

We set out in this section our findings with regard to Network Rail’s external and internal benchmarking activities led by the central Asset Management (AM) team.

B4.1 External bottom-up benchmarking – telecoms

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>We understand that Network Rail, in cooperation with European rail operators has now formally established the RTC (rail telecommunications) benchmarking group as a forum for sharing telecoms benchmarking data. The group is entirely independent of UIC / LICB workstreams, and involves the following European rail operators: Trafikverket (Sweden), Deutsche Bahn (Germany), SBB (Switzerland). More recently Belgian, Dutch and Austrian railways have become involved.</p> <p>The group has appointed consultancy Lexta to collate benchmarking results and compile a report. A comprehensive draft version of the report has been provided to us. This report presents the various categories of the analysis, approach to normalisation and peer to peer benchmarking comparison. We have reviewed this high level report and consider it to be a useful document.</p> <p>As part of the benchmarking group, Network Rail has formally visited Trafikverket in Sweden and has plans to visit Switzerland and Germany in 2013.</p> <p>Network Rail also reported other efforts to engage on bilateral benchmarking exercises with the Italian Rail Authority, London Underground and the Highways Agency although the outcome of these exercises when compared with RTC was apparently of limited benefit.</p>
<p>Methodology by which information has been</p>	<p>Data are inputted through a standard template (in a format agreed by the RTC Steering Group).</p>

<p>captured and interpreted.</p>	<p>We understand that it will be possible for participants to view directly and compare high-level expenditure levels. Detailed results have been anonymized by Lexta to ensure compliance with confidentiality requirements.</p> <p>Lexta’s report states that the information is gathered from data provided by the different companies broken down into the following categories: scope, quantity structures, service levels, contracts, costs. Additionally, Lexta asks the different companies for clarification / evaluation of special characteristics.</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>Although the RTC benchmarking report only provides a high-level data review, we understand that detailed information has been provided by each of the companies. From the summary of data provided, it appears that data have been grouped into the following categories: Lifecycle management, Radio network, Core network, E1 data transmission and Infrastructure.</p> <p>No detailed quantitative information has been provided for legal reasons. However Network Rail’s report shows cost comparisons, which were used to identify qualitative areas for efficiency improvements.</p>
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>A brief description of the normalisation is shown on RTC report. We understand that the method of normalisation has been reviewed and agreed by the different parties. Although only high level information has been provided we found the description of the normalisation methodology shown on RTC report appropriate.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Based on the RTC benchmarking exercises, Network Rail has identified several areas for efficiency improvement. Due to legal issues regarding disclosure of detailed telecoms benchmarking data, at the time of issue of this report, it was still unclear if this data would be used to support SBP submission. We understand that Network Rail is working with Lexta in order to overcome these.</p> <p>Qualitative areas of improvement have been identified and we understand that areas of</p>

	<p>efficiency improvement include:</p> <ul style="list-style-type: none"> • O&M approach: reactive vs. pre-planned • Licensing arrangements and costs. • Levels of insourcing versus outsourcing for service provision <p>As part of the progressive assurance programme, a number of forward actions have been identified such as exploring direct engagement with Deutsche Bahn (to understand their proactive approach to network management) and also Trafikverket (who apparently have little proactive maintenance and a comparatively higher level of reactive maintenance).</p>
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B4.2 Internal bottom-up benchmarking – telecoms

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>The majority of the internal bottom-up benchmarking analysis contained within the report provided relates to capital expenditure associated with renewals of concentrators, which form part of the lineside telephone infrastructure. The report also contains analysis relating to Customer Information Systems (CIS).</p> <p>The report’s analysis of factors influencing relative cost levels is largely qualitative; where quantitative cost data are sampled across routes, the report flags significant levels of variability and fluctuation that give rise to doubts about the robustness of data provided (with concerns regarding the source CAF data flagged as an issue).</p> <p>The report highlights efficiency opportunities relating to scope efficiency, greater use of competitive tendering and reduced project management costs, such as through the streamlining of approval processes. However the main emphasis of “recommendations and next steps” is on implementing an improved structure and format for unit cost reporting to ensure robust,</p>
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	comparable data.
Methodology by which information has been captured and interpreted.	Data have been sourced mainly from the CAF framework. The analysis is supported by the breakdown of relevant cost elements for concentrator and CIS renewals, by Repeatable Work Item (RWI), as captured through the CAF system.
Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.	Network Rail’s internal benchmarking report states that concentrator renewals accounted for 35% of total telecoms renewals expenditure during the period 2006-2011. CIS accounted for around a further 30% expenditure during the same period.
Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.	<p>The report identifies efficiency opportunities relating to scope reductions, changes to design specifications to ensure the scale of works is appropriate, competitive tendering and reduced project management costs, including streamlining of approval processes. A number of quantified examples are provided. The data are not analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals or to the SBP.</p> <p>One question emerging from external telecoms benchmarking is whether lineside telephone infrastructure (which the concentrator infrastructure supports) will become obsolete given the roll-out of GSM-R infrastructure across the network. Network Rail’s internal benchmarking report makes reference to the limited external comparator data resulting from European railways’ deployment of GSM-R. Network Rail appears to be continuing to see a need to maintain lineside telephone infrastructure. This appears at variance with its counterparts.</p>

B4.3 Reporter opinion

We consider that good progress has been made. Network Rail's benchmarking activities through the RTC benchmarking group have enabled a range of quantified comparisons have been made between European rail organisations, together with an analysis of factors driving differences in relative cost levels. Although several areas have been identified for efficiency improvement which Network Rail proposes to use to inform the SBP, it is not clear from the information provided to what extent these opportunities will be defined in explicitly quantified terms as part of its SBP submission.

Further progress was made with the internal benchmarking with potential efficiencies opportunities having been identified. However, data have not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals or the SBP.

Overall, the benefits of the benchmarking programme to inform SBP submission appear to be somewhat limited. In spite of this, we understand that Network Rail will continue with the benchmarking programme in order to identify efficiency gaps that may then lead to cost reductions.

B5 Electrical & Fixed Plant (E&P)

We set out in this section our findings with regard to Network Rail’s external and internal benchmarking activities led by the central Asset Management (AM) team.

B5.1 External bottom-up benchmarking – E&P

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail has engaged with a number of comparators, including Trafikverket (Sweden), Prorail (Netherlands), ADIF/VIAS (Spain) and London Underground. The engagement with these four comparators is in addition to the OFGEM exercise, already documented in our previous report. Network Rail’s main focus has been on qualitative comparisons of asset management, in order to identify best practices and efficiencies.</p> <p>The benchmarking process mainly focused on the three high-spend E&P items that were identified in the “E&P Spend Levels for Benchmarking” document:</p> <ul style="list-style-type: none"> • Signalling Power Supplies. • Overhead Line Electrification. • Third Rail Distribution. <p>Network Rail undertook a project comparison with Trafikverket - the Nassjo to Mjolby project. This project identified areas of cost efficiencies and quantified potential savings. A cost comparison exercise was also done with London Underground, although the conclusions of this study at the time of issue of this report were that it was difficult to compare with Network Rail activities.</p> <p>Network Rail also identified a number of other organisations that it is trying to engage with. These include, Irish Rail, RFI (Italy), New York City Transport (USA), UK Power Networks (UK) and also Germany, Switzerland and Austria counterparts.</p>
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<p>Methodology by which information has been captured and interpreted.</p>	<p>The main results from this workstream have been captured by site visits to the external comparators above described. These visits focused on identifying best practices for improving asset management and also identify areas for reducing costs.</p> <p>Results are derived from qualitative observations, completed through the sharing of information on a one-to-one basis and site visits. Results are summarised in site visit reports. Analysis of “potential efficiencies” are set out in terms of qualitative measures that may be implemented improve Network Rail’s asset management practices. There is also some cost comparison analysis.</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>The information provided is mainly of qualitative nature.</p> <p>In terms of quantitative analysis, a few cost comparison exercises were undertaken with the London Underground and Trafikverket although the conclusions drawn were inconclusive or require further analysis. The information gathered is unlikely to be used in the preparation of the SBP submission.</p> <p>Network Rail has shown an agenda for developing further the BUB mandate with specific actions to undertake robust quantitative analysis and also to identify best practices.</p> <p>The three high-spend E&P items that were identified in the “E&P Spend Levels for Benchmarking” document cover over 60% of the overall E&P spend for Network Rail.</p>
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>Most of the information provided is in qualitative form. For the cost comparison exercise undertaken with Trafikverket, a quantified comparator value was presented. No details on how the numerical source data were normalised appear to have been provided.</p> <p>The results of the London Underground cost comparison did not appear to be aligned.</p>

	<p>Notwithstanding these observations, Network Rail confirmed that the quantification of efficiencies is expected to continue.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Thirteen opportunities with action plans have been identified as a result of external benchmark initiatives. These have yet to be quantified for inputs into SBP efficiency plans. No substantive reference to CP5 expenditure, efficiency proposals or the SBP appears to have been included.</p>

B5.2 Internal Benchmarking – E&P

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail presented a study with the aims of identifying factors driving the variability in E&P unit costs, identifying examples of good practice and also to identify and quantify opportunities for delivering efficiency by reducing unit costs.</p> <p>Network Rail analysed 25% of the CP5 E&P asset value, with 37% being expected to be analysed in the future and 38% considered not to be ‘benchmarkable’. ‘Benchmarkable’ asset categories analysed are all related to renewals.</p> <p>Network Rail has analysed 175 unit rate activities for CP5 where 30 unit rates account for 60% of the total expenditure. These activities have been selected from the CP5 work bank as Repeatable Work Items (RWIs). The units rates studied were chosen by comparing the types of works to be delivered in CP5 and the works currently delivered in CP4 in order to allow costs to be captured and reviewed that would be of value to the CP5 submission.</p>
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<p>Methodology by which information has been captured and interpreted.</p>	<p>Network Rail's report indicated that sourcing of data has been a key challenge to validating and benchmarking unit rates. This is because the information available in the CAF system did not provide sufficient detail. Data obtained by the delivery teams did not provide the range of projects across each asset area for effective comparative analysis and there were issues with the summary data presented. To supplement available information, Network Rail issued a questionnaire to the Asset Management & Infrastructure Project delivery teams. The projects to be analysed were chosen based on the current E&P business plan. Project teams were asked to provide a cost summary against the RWI cost elements, including:</p> <ul style="list-style-type: none"> • Internal Network Rail Cost • Direct Costs – Labour / plant / Materials • Contractor On Costs • Design • Isolations / Possessions • 'Abnormals' against the RWI description <hr/> <p>Network Rail's report cites certain factors that drive differences between the cost levels of different projects such as location of activities, structural characteristics of renewed asset elements, possession arrangements and standard designs. However, the report does not contain any detailed quantified analysis or application of these factors to expenditure categories. Network Rail indicates that the main challenge is that data relating to actual costs do not provide sufficient data points for a statistical approach to be adopted. This problem was further compounded when projects were broken down into specific asset types (CP5 includes 175 RWIs). Although the aim of the exercise is to allow detailed like for like comparisons to be made at a highly granular level, Network Rail indicates that the data are inconsistent and not extensive enough to permit a statistical approach.</p>
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<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>Due to the nature of the E&P work bank only 63% by value was eligible for benchmarking. Due to the difficulty in obtaining relevant project data, only 25% of renewals activity by value was analysed in Network Rail’s internal benchmarking report. Further work is planned by the business to obtain data for the remaining 37% of the ‘benchmarkable’ asset categories.</p> <p>The conclusion of findings varies depending on the activity of the asset areas. In general the high number of different repeatable work items and low number of projects covering the same work types has provided a set of data that has resulted in only limited analysis being possible.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Network rail identified a number of actions to develop internal unit cost benchmarking further. Although the study identified differences in certain unit rates between regions, only a limited understanding could be gained from this exercise of underlying structural factors. We consider it unlikely that the finding of this study will be used to inform efficiencies for the SBP efficiency proposals.</p>

B5.3 Reporter opinion

We consider that reasonable progress has been made with external bottom-up benchmarking activities. Network Rail has engaged with a number of comparators. Data obtained are principally qualitative in nature, with a limited amount of quantified comparative data obtained through benchmarking with UK energy distribution network operators via OfGEM (as documented in our previous review). Several opportunities with action plans have been identified as a result of external benchmark initiatives.

Further progress was made with internal benchmarking. Potential efficiency opportunities have been identified. Network Rail's study identified differences in certain unit rates between regions. Only a limited understanding of underlying structural factors has been possible due to the difficulty in gathering data.

Overall, E&P benchmarking data have not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided for review, and the benefits of the benchmarking programme to inform SBP submission appear to be somewhat limited. We understand that Network Rail will continue with the benchmarking programme in order to help quantify the efficiency gap and cost reduction.

B6 Civils Benchmarking (including Structures and earthworks)

B6.1 External bottom-up benchmarking – Civils (AM team)

We set out in this section our findings with regard to Network Rail’s external benchmarking activities led by the central Asset Management (AM) team.

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail has engaged with a number of comparator organisations under this workstream—including contacts identified and facilitated by Arup / Imperial College. These are mainly overseas rail infrastructure operators. The focus has been on qualitative comparisons of asset management and the sharing of best practices.</p> <p>Network Rail has stated that the AM-led benchmarking was initiated in response to recommendations from Arup’s mandate AO/007 (review of asset policy, stewardship and management of structures), but that the scope of work has been expanded to accommodate recommendations from this mandate (AO/015 bottom-up benchmarking review).</p> <p>Network Rail has obtained qualitative information regarding comparators’ asset management practices. Salient themes that have emerged from the benchmarking include:</p> <ul style="list-style-type: none"> • Approach to asset lifecycle planning and intervention. • Safety-related parameters and how they are managed. • Possessions and access. • Work packaging and delivery process. • Safety compliance, parameters. • Inspections processes and management of asset data & systems
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	Network Rail indicated it has been unable to obtain comparator cost data or other quantified metrics to inform the efficiency gap analysis to date, due to comparators' concerns regarding data confidentiality.
Methodology by which information has been captured and interpreted.	The main results from this workstream are captured in a report, written by Capita Symonds. Results are derived from qualitative observations, completed through the sharing of information on a one-to-one basis and site visits. An analysis of "potential efficiencies" is set out in terms of qualitative measures that may be implemented improve Network Rail's asset management practices.
Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail's overall expenditure in the given area.	Information provided is qualitative in nature. No quantified benchmarks have been included. No assessment has yet been provided of the quantified efficiency impact, or timescales for implementation, of the improvement measures relating to asset management identified through the study.
How comparator information is normalised and compared to Network Rail activities / outputs / costs.	Information has been provided in qualitative terms. Proposals for improvement are at this stage not linked to Network Rail outputs or costs.
Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.	No substantive reference is contained within the material provided that relates to CP5 expenditure or efficiencies proposals or the SBP.

B6.2 External bottom-up benchmarking – Civils (IP team)

We set out in this section our findings with regard to Network Rail’s external benchmarking activities led by the central Investment Projects (IP) team.

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail’s Investment Projects (IP) team is in the process of expanding the analysis it originally carried out comparing costs between organisations engaged in a “benchmarking alliance”.</p> <p>Network Rail indicated that it plans to build upon the initial sample of three projects between four comparators that were presented in its February 2011 report. We understand that the study is being extended to include:</p> <ul style="list-style-type: none"> • Two additional comparator organisations - Skanska and Murphy – who have joined the original benchmarking alliance group (Network Rail, Birse, Bam, Vinci and Faithful+Gould); • Two additional sample civils projects to be added, involving station enhancements for disabled access, and platform extensions. <p>The results have been collated and analysed by Faithful+Gould. The Faithful+Gould project specification document indicates that the results of the study were due to be presented to both the ORR and the Department for Transport at the end of July 2012, although we understand that this presentation has yet to take place. At the time of writing, the latest version of the Faithful+Gould report remains a “draft”.</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>Contractors have been invited to provide a priced tender in response to five sample projects in the UK. Contractors priced the work utilising the rates applicable to their given project location.</p>

<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>Network Rail has obtained a preliminary set of results for the benchmarking exercise involving five contractors operating in both the UK and various European railway civil engineering construction markets. This includes a comparison of project costs across five sample projects. Network Rail has also undertaken a preliminary analysis of the factors driving the differences in relative cost levels. However, a finalised set of results and analysis is yet to be provided.</p>
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>Network Rail has carried out adjustments in its comparative analysis to normalise certain factors affecting cost levels to enable cost comparison. The normalisation process captures pricing omissions and items that are not required in specific countries.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>A preliminary set of benchmarking results and analysis has been provided.</p>

B6.3 Internal bottom-up benchmarking – Civils

We set out in this section our findings with regard to Network Rail’s internal benchmarking activities led by the central Asset Management (AM) team.

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail’s internal civils benchmarking work is based around the following two areas of study:</p> <ul style="list-style-type: none"> • Best practice benchmarking: this involves the comparison of asset management best practice, comparing five Network Rail “routes” (although these routes are less disaggregated than the ten routes Network Rail is now structured into following devolution). The two reports, relating to civils structures and earthworks, were written
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	<p>by Capita Symonds. The best-practice benchmarking was commissioned in response to Arup’s recommendation to carry out internal benchmarking as a means to assess asset performance. The reports contain comparative analysis of asset management processes, performance and interventions. The reports also contain top-down comparisons of relative expenditure levels across the different regions and causal factors.</p> <ul style="list-style-type: none"> • Unit cost benchmarking: Network Rail has undertaken detailed analysis of unit cost data in order to compare relative cost levels between different regions. This includes: <ul style="list-style-type: none"> ○ Civils structures unit cost benchmarking: this report contains comparative analysis of unit costs associated with several principal renewal intervention types. Unit costs are sourced from CAF. Comparator unit cost data is from across the ten routes compared. The aim is to identify the leading-edge unit cost for each activity. The majority of the report is focused on structural factors influencing differential unit cost levels (post normalisation). ○ Earthworks unit cost benchmarking: This report is principally concerned with unit costs from various sources feeding into IIP and SBP, how these can be reconciled, and their applicability to CP5. There is one chapter that contains comparative analysis of unit costs for a number of key earthworks interventions between the five Network Rail former territories (as opposed to the ten routes). <p>The internal benchmarking is presented in terms of “one-off” reports. The Capita Symonds report highlights that there is not presently a routine, embedded process within Network Rail that enables relative cost and efficiency to be benchmarked and analysed at a granular level.</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>Best practice benchmarking: the study combined information from various published and internal Network Rail data sources. These relate to asset characteristics and performance, with direct liaison and interviews with both central Asset Management and other business planning functions within Network Rail, Route Asset Managers (RAMs) and teams delivering renewals works on the ground. The mainly qualitative results and observations obtained are captured and</p>

	<p>analysed within the Capita reports.</p> <p>Unit cost benchmarking:</p> <ul style="list-style-type: none"> • Civils structures unit cost benchmarking data is sourced from historic CAF data. Unit costs are sourced from CAF. Comparator unit cost data from across the ten routes are compared, with normalising adjustments made to take out “structural factors” through various detailed regressions. A post-adjustment comparison of relative unit cost levels is then made, with the region achieving the lowest benchmarking unit cost highlighted as representative of “Best Demonstrable Practice”. The report sets out the BDP values as target efficiency levels across all regions, from which efficiency potential is then estimated. • Earthworks unit cost data utilised in the comparative cost analysis are sourced from historic CAF data. The numbers are collated and presented in tables within the report, but no further detailed commentary or analysis of what the figures show is provided, as the regional trends are considered largely inconclusive.
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>Best practice benchmarking contains top-down comparisons of total expenditure levels across regions, but does not contain detailed bottom-up comparisons of expenditure elements. The report outputs are principally qualitative.</p> <p>Unit cost benchmarking:</p> <ul style="list-style-type: none"> • Civils structures unit cost benchmarking: Network Rail states these expenditure categories related to 57% of total “historical spend” although it the periodicity and scope of the “historical spend” figure relates to is not defined. • Earthworks unit cost benchmarking: numerical breakdowns of expenditure included within the report, compared across five “former territories” of Network Rail. (Note: assessment of quantified coverage level is yet to be concluded).

<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Best practice benchmarking: the report makes high-level observations of qualitative factors that may influence efficiency. These are not explicitly quantified or linked to CP5 expenditure or efficiency proposals.</p> <p>Unit cost benchmarking:</p> <ul style="list-style-type: none"> • Civils structures: the report focuses on structural factors leading to differential cost levels. Efficiency potential is viewed in terms of differences between unit cost levels post-normalisation. However, specific measures or factors driving the differences in post-normalised are not discussed. • Earthworks: the report does not contain any detailed discussion of CP5 efficiencies.
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B6.4 Reporter opinion

Since the last report, Network Rail has made some progress through the engagement with a number of parties. These include a range of international rail organisations and a number of major contractors. On the internal benchmarking front, the business has engaged in best practice benchmarking and unit cost benchmarking. Capita Symonds has assisted with this work. The outputs from the various workstream are a mix of qualitative analysis (external bottom-up benchmarking AM team) and quantitative analysis (internal bottom-up and external bottom-up benchmarking IP team). The analysis shared with Arup by the AM team does not appear to contain substantive quantified analysis that can be applied to CP5 expenditure plans or the SBP submission.

On the other hand, the IP investments team engaged in a benchmarking group and was able to compare costs with a number of comparators. A preliminary set of benchmarking results and analysis have been provided.

We note that progress has been made with regard to the engagement with comparators. Several opportunities with action plans have been identified as a result of external benchmarking initiatives and a range of new entities such as major contractors are now getting involved. However, it is not evident that there is sufficient time for these developments will be in time to inform Network Rail’s SBP efficiency plans.

Further progress was made with the internal benchmarking of potential efficiencies. Opportunities for cost reduction have been identified. These include high-level observations that may influence efficiency. Structural factors that help better to understand difference in unit cost levels have been identified. Work completed has identified differences in a number of unit rates between regions. However it has only provided a limited understanding of the underlying factors involved. This was due to the difficulty in gathering data. Network Rail considers it unlikely that the findings of this study will be used to inform efficiencies for the SBP efficiency proposals.

Overall, civils & earthworks benchmarking data have not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided for review. We understand that Network Rail will continue with the benchmarking programme for civils up to and beyond the point of SBP submission, as it consider the benchmarking to be part of a long term programme of efficiency analysis and improvement.

B7 Buildings

We set out in this section our findings with regard to Network Rail’s external and internal benchmarking activities led by the central Buildings Asset Management (AM) team, which is leading the development of Network Rail’s CP5 expenditure and efficiency proposals for Buildings.

B7.1 External bottom-up benchmarking – Buildings

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>During the last twelve months the external benchmarking led by the AM team leading the development of Network Rail’s CP5 proposals for buildings has focused on “the high level” business practices, best practice identification and in particular, what ‘best practice’ looks like at the Asset Management level This builds on previous work by AMCL. The main results of this external benchmarking activity are captured in Network Rail’s combined external bottom-up benchmarking report completed by Capita Symonds, which covers both buildings and civils & earthworks assets.</p> <p>The buildings AM team indicated that its current benchmarking programme builds upon the external civils benchmarking activity led by Network Rail’s IP team (this is reviewed in the previous section of this report). The IP team’s benchmarking included three buildings schemes relate to station disabled access / lift installation, and platform extensions. Very limited reference to IP-led benchmarking has been made in material provided by the AM team. The Capita report does not make any explicit linkage or reference to that work.</p> <p>The AM team has made progress in establishing relationships with new and existing peers. Six comparators were included in the buildings benchmarking: London Underground, Trafikverket, Kiwi Rail, Auckland Rail, The New Zealand Government and Westpac Bank (an Australasian bank which manages a diverse stock of buildings).</p> <p>Other parties that have expressed interest in participating include: BAA Heathrow (itself half way through benchmarking activities), CIE Irish Railways, New Zealand Transport Authority (Highways) and Nexus, Newcastle. The team are trying to engage with SNCF, but were not</p>
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	<p>successful with Prorail (Netherlands), or New York City Transit. The initial idea of engaging with retail operators has not been pursued.</p> <p>Although Network Rail’s original stated intention was to obtain quantifiable information, this has not been achieved to date. Network Rail explained that establishing relationships with external partners has taken time with peers are reluctant to share data. This has limited the speed of progress. Network Rail emphasised that the current benchmarking initiative is a long term endeavour.</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>The Capita Symonds report is based on results obtained from targeted meetings held with peers. The aim of these interactions has been to understand their approach and to discuss high level asset management maturity and to identify best practices that could be transferred to Network Rail. ‘Spider’ diagrams / radar charts had been developed that benchmark peers against Network Rail to gauge relative asset management maturity in a range of dimensions (these charts were not available in time for the writing of this report). The report does not contain any cost-related comparisons or quantified analysis.</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>The Capita Symonds report sets out in detail the approach taken, the results obtained from the comparator organisations, and the interpretation of their potential applicability to Network Rail. The analysis and information is qualitative in nature.</p> <p>Network Rail has stated it is unlikely that unit cost data will be available for SBP, but that it considers availability within 12 months is likely.</p> <p>We note that quantified benchmarking relating to buildings assets has been obtained through the IP workstream, where the cost of three station asset renewals schemes is benchmarked against five peers (three peers had been achieved at the time of the last mandate). This is discussed in the previous section of this report. As noted above, the IP benchmarking is not part of the detailed benchmarking analysis presented by the Buildings AM team.</p>

<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>As indicated above, comparative benchmarking analysis within the Capita report is undertaken only on a qualitative basis.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Network Rail indicated that no substantive quantified benchmarking data are expected to be contained within CP5 expenditure or efficiency proposals feeding into the SBP. Network Rail has stated that the link to CP5 estimates for efficiencies derived from the benchmarking analysis will be essentially based on expert opinion. Efficiency opportunities are fed through to the routes through ‘briefing packs’, with the routes adding these to their portfolio of initiatives as appropriate to support their high level expenditure and efficiency projections that will support their CP5 expenditure and efficiency submissions feeding into the SBP⁹.</p> <p>We note that, although the buildings AM team stated in meetings that the IP team’s benchmarking (reviewed in the previous section of this report) directly informed the proposals relating to improved renewals delivery (working windows, possession, overhead control, etc.), this benchmarking work is not cited explicitly in the Capita report or other notes and documentation relating to CP5 efficiencies.</p> <p>Network Rail explained that of eight specific initiatives being developed by the Buildings CP5 team, no more than three are derived directly from the bottom-up benchmarking programme: Innovation & Policy Improvement (such as improved design of materials), Procurement Methods (including improved supply chain partnering and better performance specifications), and Procurement Packaging (including more integrated approaches to design and delivery). Network Rail stated that external benchmarking has not directly informed the other five asset management initiatives, but indicated in meetings that this has been very helpful as a “sense check”.</p>

⁹ Arup is reviewing in detail the development of expenditure and efficiency proposals in the SBP under mandates AO/034 (focusing on unit costs) and AO/035 (focusing on CP5 efficiency proposals).

B7.2 Internal bottom-up benchmarking – Buildings

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail’s internal benchmarking is focused principally around the derivation of comparative unit costs for buildings renewals activities across the different routes to support the development of SBP expenditure and efficiency submissions. (We note that Network Rail’s unit costs utilised for planning are the subject of a separate review by the Independent Reporter under mandate AO/034).</p> <p>Although Network Rail states in its report that an objective of the unit cost benchmarking is “identifying and quantifying, where possible, opportunities for delivering efficiency and sharing examples of good practice”, the subsequent analysis is concerned mainly with assessing the structural factors driving differential levels of cost between the routes. Only limited, high-level reference is made to potential efficiency factors.</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>The internal benchmarking report sets out the results of its benchmarking of eight repeatable, common work items were benchmarked relating to common renewal / replacement activities: Roof Covering, Platform Supports, Drainage Channel replacement, Platform Resurfacing, Platform Copers, Footbridge Internal Stair Structure renewal, Platform Mass Fill replacement and Footbridge Steel Beams.</p> <p>The approach has been to adopt a common cost build up for each work item based on standardised national costs (there are 86 national unit rates developed by Franklin & Andrews). Following application of centrally applied adjustments, these rates were then subject to review and adjustment by the individual routes, with the aim of reflecting the true cost of delivering these projects locally due to structural factors, local circumstances or local</p>

	<p>ways or working. In so doing, the intention was that this would facilitate an understanding and quantification of factors affecting costs. The objective was to review the applicability of national unit costs, and develop robust estimates of CP5 expenditure and efficiency for the SBP. However, cost comparisons are largely based on expectations rather than comparisons of real costs for completed projects.</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>The quantified internal unit cost data presented in the internal benchmarking relate to eight work items, which account for approximately 50% of CP5 buildings expenditure.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>In terms of potential efficiency, only one specific opportunity is explicitly cited within the internal benchmarking analysis - the potential utilisation of Perspex (as opposed to glass) for platform canopy roofing. The only other efficiency related factor cited in the report is optimised possession arrangements. None of the factors appear to have been quantified to estimate the scale of either regional or national efficiencies that may occur through implementing better practices.</p> <p>We understand that further investigations are on-going to understand the more efficient use of possessions. At this stage, details of opportunities are not yet fully understood or scalable to a quantified regional or national efficiency for CP5. Work is ongoing.</p>

B7.3 Reporter opinion

We consider that good progress was made with the buildings work stream namely with Network Rail increasing the pool of comparators beyond the usual ex-LICB European railways. However due to the late commencement when compared with other asset work streams, the engagement plan is not yet sufficiently advanced to ensure a good range of comparators in time for SBP. We understand that Network Rail is looking to further expand coverage to include Irish Railways, BAA Heathrow, Newcastle Nexus, DLR and the New York MTR Long Island Railroad.

Internal benchmarking has only shown one specific efficiency opportunity. There is a risk that best practices will not be found in time for use in formulating the SBP.

Overall, buildings benchmarking data have not been analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided for review. We understand that Network Rail will continue with the benchmarking programme in order to quantify efficiency gaps that can be included in its cost reduction plans.

B8 Maintenance Benchmarking

B8.1 External bottom-up benchmarking – Maintenance

We set out in this section our findings with regard to Network Rail’s external benchmarking activities led by the central maintenance team.

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>Network Rail has obtained external comparator information by means of meetings and site visits mainly with overseas European rail organisations. We understand that in addition to the site visits undertaken and commented upon in our previous review under this mandate, a further visit to France has been undertaken, as well as a visit to the US to observe management of vegetation.</p> <p>The documentation provided contains mainly qualitative analysis derived from comparisons between UK and overseas rail asset management and maintenance delivery practices. Although the main summary document provided indicates that external benchmarking activity involves converting the activities of comparators into unit costs, the document states good practices identified have not yet been quantified. Quantification of “what best in class should be” will form part of the ongoing work in this area.</p> <p>As appendices to the main summary report, Network Rail has provided a number of documents setting out in qualitative terms areas for efficiency improvement. The appendices are as follows:</p> <ul style="list-style-type: none"> • Appendix A - Maintenance Internal Benchmarking (reviewed in the next section of this report). • Appendix B – Risk Based Maintenance • Appendix C – Asset Information • Appendix D – Mechanisation
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	<ul style="list-style-type: none"> • Appendix E - Possession Management • Appendix F – Contract Strategy • Appendix G – Intelligent Infrastructure • Appendix H – Indirect Staff • Appendix I – Multi Skilling • Appendix J – Site Safety • Appendix K – Rapid Response • Appendix L – Standardisation <p>Each appendix contains a discussion of the proposed efficiency area, with practices of comparators cited to varying degrees. For each efficiency area the efficiency potential and applicability to Network Rail are discussed. Generally this is without quantification of benefits, costs or timescales for their implementation.</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>We understand that external benchmarking data have been obtained through meetings and site visits with comparator organisations (as documented in our previous report). Previously we reviewed how activities viewed overseas were built up using Network Rail internal costs to provide a benchmark comparison against overseas comparators. It would appear no further quantified analysis of this nature has been provided for the current review. New material has instead focused on specific efficiency opportunities and their potential application (as discussed above).</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>We summarise the degree of quantified / numerical information contained within the eleven Appendix documents that capture the outputs from Network Rail’s maintenance benchmarking activities below:</p> <ul style="list-style-type: none"> • Appendix B – Risk Based Maintenance: some quantified information, with a

	<p>comparison table showing time in weeks between the basic inspection of track, signalling and telecoms.</p> <ul style="list-style-type: none"> • Appendix C – Asset Information: no substantive quantified information. • Appendix D – Mechanisation: no substantive quantified information. • Appendix E - Possession Management: no substantive quantified information. • Appendix F – Contract Strategy: quotes estimated efficiency potential as high-level figure, but no details of supporting calculations or source benchmarks. • Appendix G – Intelligent Infrastructure: no substantive quantified information. • Appendix H – Indirect Staff: some quantified information on staffing and resourcing times / hours. • Appendix I – Multi Skilling: some quantified information • Appendix J – Site Safety: no substantive quantified information (except information highlighting the scope of safety costs within Network Rail’s cost base). • Appendix K – Rapid Response: no substantive quantified information. • Appendix L – Standardisation: Some quantitative data showing unit costs at Network Rail compared to some comparators in different countries. Potential cost savings if Network Rail standardise processes is also included.
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>Information provided in our previous report set out how Network Rail’s maintenance benchmarking methodology involved the normalisation of unit costs by country, undertaking bottom-up costing of the same schemes for Network Rail and the comparator railway. Although some unit cost observations for France and Sweden were shown in the presentation, no new quantified analysis of this nature has been provided for the current review.</p>

<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>Network Rail’s assessment of the potential applicability of information and outputs derived from its benchmarking is captured through its maintenance report and the attached annexes relating to eleven efficiency areas (as set out above).</p> <p>In terms of the applicability to CP5, the analysis for each efficiency area sets out in qualitative terms the potential benefits that could be gained from the given efficiency area / initiative. However, there is no substantive quantified analysis of the efficiency benefits over CP5 and beyond, and very limited detail about implementation costs.</p> <p>In overall terms, Network Rail indicates that, in general, “there have not been many ‘Eureka moments’ in the international benchmarking, but some small, good ideas have been identified and the benchmarking has provided us with confidence in what we are doing, whilst other European railways have been interested in learning from Network Rail”.</p> <p>Network Rail has stated it is intending to quantify efficiencies derived from these opportunities to support its SBP submission, but further specific details of this process and the timescales for completing this analysis have yet to be provided.</p>
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B8.2 Internal bottom-up benchmarking – Maintenance

We set out in this section our findings with regard to Network Rail’s internal benchmarking activities led by the central maintenance team.

<p>Nature and scope of comparator information obtained since our previous review.</p>	<p>The aim of the internal and external benchmarking workstreams is explicitly to identify areas of good practice and efficiency opportunities.</p> <p>Two workstreams have been undertaken: benchmarking at a Delivery Unit (DU) Level and Activity Level spend. The former has not been developed since our last review and technical recommendations on statistical approach appear not to have been taken on board.</p>
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	<p>The activity level benchmarking uses Maintenance Unity Costs, for which approximately 80,000 work orders are completed each week by 39 delivery units, offering a very rich data source with which to benchmark maintenance costs.</p>
<p>Methodology by which information has been captured and interpreted.</p>	<p>The standardised MUC framework defines individual maintenance activities, for which a unit cost and volume is measured and reported. Within each defined MUC, Network Rail has analysed volumes of labour and material, plant, contractor elements and the costs for each. Additional data collected from various sources cover track asset information (mileages, speeds, age or rail, sleepers, S&C, etc), possession information, traffic and tonnage electrification characteristics, track geometry, etc.</p> <p>In both cases of the activity and delivery unit level, the analytical approach is very similar. Network Rail identifies a selection of observable characteristics which are believed to affect cost and relates these to some measure of cost in a log-linear regression model. Stepwise regression is used to determine the covariates that end up in the final model. The regressions are based on cross-sectional data. Even in situations in which there is a temporal element to the data (i.e. units at different points in time) these are treated effectively as cross-sectional. In the activity level analysis the dependent variable is cost per unit of volume, for the DU analysis, total cost is used.</p>
<p>Degree of quantified / numerical data and observations, vs. qualitative information, and the level of coverage relative to Network Rail’s overall expenditure in the given area.</p>	<p>The work is inherently quantitative, with large volumes of data from the MUCs. The MUCs cover 65% of total unit costs of the maintenance division. It is not clear at this stage what percentage of these were analysed, although individual regression models were focused on areas of greatest expenditure.</p>
<p>How comparator information is normalised and compared to Network Rail activities / outputs / costs.</p>	<p>The statistical regression analysis has aimed to account for exogenous and structural factors. The factors considered as affecting costs were identified, listed qualitatively and, we understand, tested wherever possible. Those that were reported as being significant for the</p>

	<p>MUC analysis (other than volume) were:</p> <ul style="list-style-type: none"> • Rail Changing: possession lengths, possession of third rail; • Manual Correction of Plain Line Geometry: the method of delivery for manual geometry correction. • Other activities had low significance (Tamping; traffic density, 3rd rail and jointed rail but not significant) or were correlated with volume of work. <p>Network Rail has concluded that there was insufficient availability of structural factors at a granular level.</p>
<p>Forward-looking application of benchmarking-based information and analysis for CP5 efficiencies underpinning the SBP efficiency proposals.</p>	<p>The MUC analysis has not identified efficiency opportunities as far as we can tell. Network Rail states that a lack of variation at a MUC level has been observed, which it reports as surprising.</p> <p>The only specific efficiency opportunity from the internal benchmarking in the reports we have reviewed relates to opportunities for greater standardisation to improve delivery of common or complex maintenance tasks. A specific project, called Standardisation, is spearheading this initiative.</p> <p>Information provided by Network Rail has not yet shown costs in this initiative to identify network-wide SBP efficiencies for CP5.</p>

B8.3 Reporter Opinion

Network Rail's external bottom-up benchmarking, undertaken by means of first-hand observations of maintenance delivery, has yielded both qualitative and quantitative external benchmarking comparisons. Drawing upon the data obtained, Network Rail has presented, in mainly qualitative terms, a range of areas of efficiency improvement. A range of documents covering a considerable number of themes have been shared with us. Each contains an analysis of efficiency potential and applicability to Network Rail. Generally this is not quantified in terms of benefits and costs.

With respect to internal bottom-up benchmarking, Network Rail continues to focus mainly on the analysis of cost-differentiating factors affecting differences in relative cost levels across the business. The Delivery Unit workstream appears not to have progressed much since our previous review. In the case of Activity Level analysis, Network Rail has analysed volumes and costs for labour, material, plant and contractor components. Statistical analysis has been undertaken to tease out exogenous and structural factors. A small number of unit cost measures have appeared to have significant exogenous variables. However, in overall terms, a lack of variation in unit costs has been observed. Network Rail (and the Reporter) find this somewhat surprising. An efficiency opportunity called "Standardisation" (to improve delivery of common or complex maintenance tasks) has emerged from the internal benchmarking work.

Overall, in spite of the comparatively wide-ranging scope of benchmarking analysis undertaken, the data provided have not been explicitly analysed or quantified in terms of overall cost savings or efficiencies relating to forward-looking CP5 efficiency proposals within the documentation provided for review.

Appendix C

List of Meetings

Meeting	Date	Attendees
Telecoms	13/08/2012	ORR: Richard Coates, Mervyn Carter Network Rail: Fraser Allan, Richard Lawes, Ashley Shelbrooke Arup: Richard Anderson, Bruno Delgado, Tim Ashwin
Track	13/08/2012	ORR: Richard Coates, Mervyn Carter, Colin Greenslade Network Rail: Piers Treacher, Mark Hadley, Sue Coverdale, Didar Dalkic, Chris Docker, Sam Chessex Arup: Alexander Jan, Alastair Jackson, Richard Anderson, Bruno Delgado
Buildings	17/08/2012	ORR: Richard Coates, Mervyn Carter, Colin Greenslade Network Rail: Piers Treacher, Blake Driscoll, Richard Logue, Stephen Sutcliffe, Mary Jordan Arup: Richard Anderson, Tim Ashwin
Civils, Structures and Earthworks	21/08/2012	ORR: Richard Coates, Mervyn Carter Network Rail: Tony Wilcock, Piers Treacher, Mark Evans, Phil Bailey, Alan Crawley Arup: Richard Anderson, Bruno Delgado, Tim Ashwin
E&P	22/08/2012	ORR: Richard Coates, Matthew Wikeley, Adam Meredith Network Rail: Piers Treacher, Phil Collins, Simon Green, Andy Heather, Sam Chessex Arup: Richard Anderson, Bruno Delgado
Signalling (external bottom-up benchmarking)	24/08/2012	ORR: Richard Coates, Anna O'Connor; Ian Maxwell; Network Rail: Piers Treacher, Robert Ireland, James Dunshea; Arup: Richard Anderson, Bruno Delgado

Meeting	Date	Attendees
Maintenance	24/08/2012	ORR: Richard Coates, Mervyn Carter; Network Rail: Piers Treacher, Chris Madden, Mary Jordan Arup: Richard Anderson, Daniel Graham, Bruno Delgado
Signalling (internal bottom-up benchmarking)	20/09/2012	ORR: Richard Coates; Network Rail: Piers Treacher, Robert Ireland, Andrew Shaw; Kevin Newman Arup: Tim Ashwin, Finlay McPhail
Track (CP5 unit rates)	26/09/2012	Network Rail: Chris Docker, Didar Dalkic, Piers Treacher; Arup: Bruno Delgado, Arash Mojabi
Draft report review meeting	24/10/2012	ORR: Richard Coates; Network Rail: Piers Treacher, Mary Jordan Arup: Alexander Jan, Tim Ashwin

Appendix D

List of Reviewed Documents

**Please note: for reasons of commercial confidentiality, Appendix D
has been redacted for the public version of this report.**
